VOL. LXXI. No. 2756

The Builder.

SEPTEMBER 19, 1896.

ILLUSTRATIONS.

Church of St. David, Exeter: Exterior. Mr. W. D. Caröe, F.R.I.B.A., architect ..... *Double-Page Ink-Photo.*
Church of St. David, Exeter: Interior. Mr. W. D. Caröe, F.R.I.B.A., architect ..... *Double-Page Ink-Photo.*
New Premises, Universities Mission to Central Africa. Mr. G. C. Horsley, architect ..... *Double-Page Photo-Litho.*
York Gate. Measured and drawn by Mr. W. R. Mosley ..... *Double-Page Photo-Litho.*

Blocks in Text.

Weekley Hospital, Northampton ..... Page 224
Sketches of London Street Architecture: No. V.—Houses in Hanover-road.—Mr. C. F. A. Voysey, architect ..... „ 223
Improved drain pipe section, by Mr. A. B. Plummer ..... Page 232
Diagrams of construction of drainage trenches ..... „ 234

CONTENTS.

The Architectural Association Sketch-book 223
City of Chester Water Supply 224
Notes 225
The Cambrian Archæological Association 227
Sketches of London Street Architecture—V. 228
The Sanitary Institute 228
St. David's, Exeter 230
New Premises for the Universities' Mission to Central Africa 231
York Water Gate 232
Competitions 232
National Association of Slate Merchants and Slaters 232
Restoration of the Mausoleum 233
The Priory of St. John the Baptist, Hallwell 233
"Design for a Country House" 233
Student's Column: Rural Drainage.—XII. 234
General Building News 235
Sanitary and Engineering News 236
Stained Glass and Decoration 237
Foreign 237
Miscellaneous 237
Legal 237
Meetings 238
Recent Patents 238
Some Recent Sales of Property 239

The Architectural Association Sketch Book.

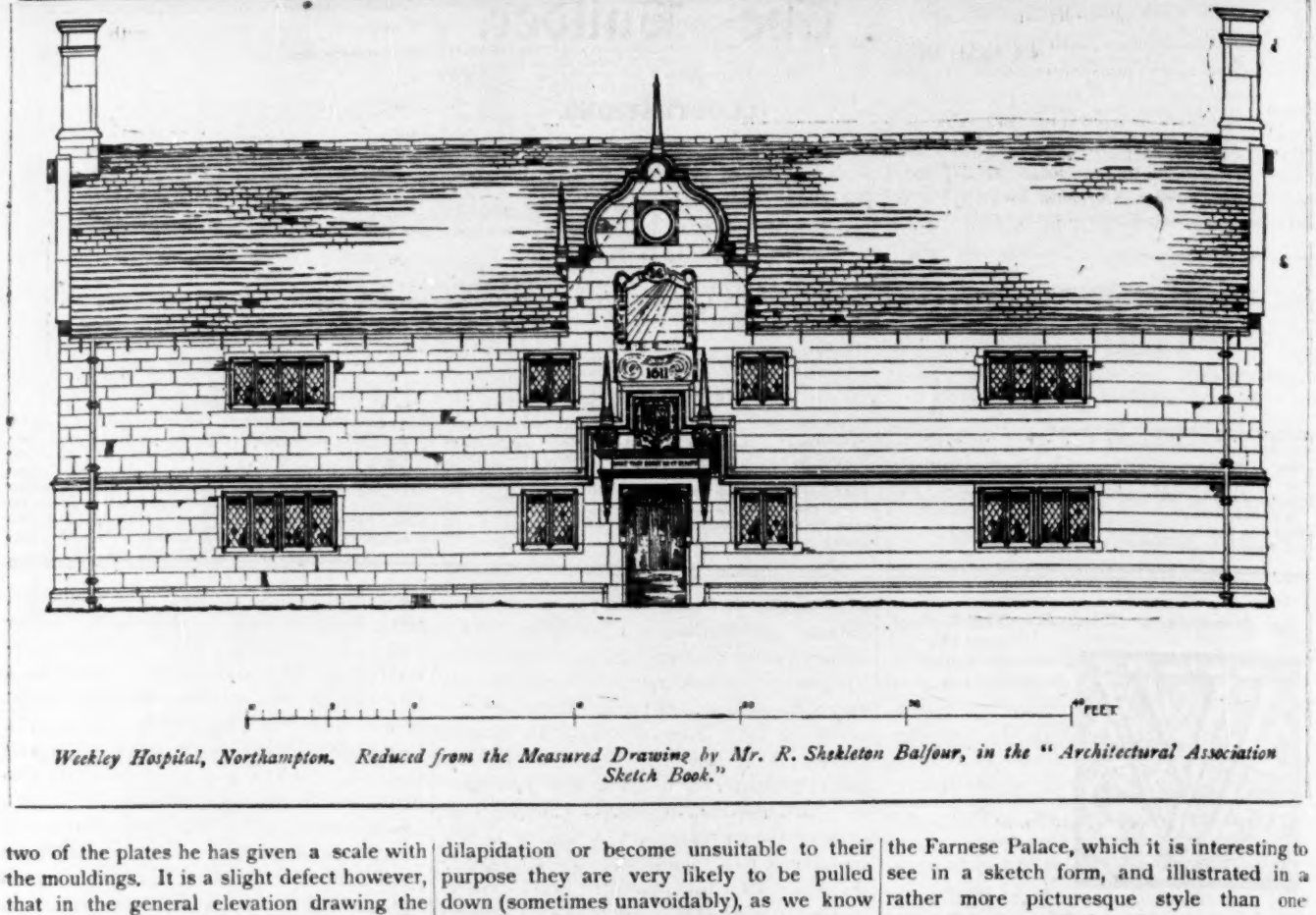
WE are very glad to see the "Sketch-Book" re-appear, after a considerable interval, in a "Third Series," of which the seventy-two plates forming the first volume are now issued, and apparently with as good a prospect as ever of a long and brilliant career. Indeed there is no reason why such a series of sketches should not be carried on almost indefinitely. There is almost endless material in the world for architectural and decorative sketching; and if it were possible to get to the end of it, by that time a new generation would have sprung up to whom the subjects originally sketched would be new again.

The editors, Mr. W. G. B. Lewis and Mr. John Begg, express a hope that the third series will be found if possible to more than maintain the quality of the earlier editions. We hardly think the "more than maintain" can be sustained; the present volume is perhaps an advance upon the more recent ones; but we think we have seen finer drawings in some of the earlier series than any we find in the new volume. An improvement in the quality of the paper used is claimed, and is apparent.

If the drawings do not surpass all that have appeared in earlier volumes, they are nevertheless a fine and interesting set of illustrations of architecture. But there are two kinds of interest attaching to such a collection. We may regard them either as illustrations of ancient work put on record as materials for study, or as examples of the art and the various methods of architectural drawing. In the former aspect the choice of subjects which we meet with is of some interest as an indication of the tendency of architectural taste and sympathy at the moment; and in this respect the result of our examination is rather a surprise. The editors, in a communication accompanying the volume, observe that "to meet the wishes of subscribers much later work has been included, but there are still to be found good examples of earlier date." The examples of early work are indeed very few, and chiefly among the drawings of Italian subjects. But what strikes us more than this is the extraordinary predominance of English Gothic subjects, when we consider how much Gothic has gone out of fashion now in actual practice, except in church work; and even there it is generally only a modification of ancient Gothic that is adopted. But in the Sketch-Book the greater number of English examples, of which there are fifty-nine out of the total of seventy-two plates, are of English Gothic of rather late date, and the views of Heckington and Oundle churches seem to carry us back a quarter of a century, to the days when the study and sketching of mediæval churches was the main enthusiasm of the architectural student. Careful drawings of traceried windows are also included, as in the days when it was the orthodox thing to reproduce in modern churches the designs of mediæval tracery. We find no fault with the choice; on the contrary it is well that so pure a style as English Gothic should be made the subject of study; but its predominance here is surprising in view of the pronounced tendency of the day, in actual work, in favour of English Classic, which on the other hand is very sparingly represented in Sketchbook.

There seems to be a greater proportion of geometrical measured drawing in the new volume than has usually been the case. In a series of sketches made, as one may say, by architects for architects, this is as it should be. The art of picturesque sketching of architectural subjects is indeed a charming and most fascinating one, and we hope the Architectural Association Sketch-Book will never be without good examples of it; it represents the poetry of architectural sketching, and has in an artistic sense a double interest, that arising from the architecture itself which is sketched, and that arising from its artistic treatment by the sketcher; his method of using his materials, and his reading of the effect of the building. But the serious business, or the plain prose of architectural sketching, lies most in measured drawings and large size details, and of these there are plenty in the volume before us. Among the measured drawings of Gothic work we would especially mention Mr. Wigfull's careful and interesting series of drawings of the north transept of Lincoln (plates 40 to 43), in which the whole construction is carefully made out; we have the plans at four different levels, the complete elevation (is not the plate tracery of the circular window shown rather too thin?), the two side elevations, and a complete section, showing the timber roof and everything. This is a very workmanlike set of drawings, the product of a good deal of serious labour; they are supplemented by two drawings by Mr. Greenslade, a measured drawing of the rose window, and sketches of its carved details. We have also two pages by Mr. Begg devoted to Lincoln; measured drawings of the Rood Screen, and a very charming sketch of the exterior of the chapter house. Mr. Dunn contributes a good series of illustrations of Gloucester Cathedral, among which the transverse section of the North Walk and Lavatory is especially interesting, the actual aspect of the work being realistically shown by a reproduction from a photograph, so that we can compare the effect with the means of obtaining it as shown in the measured drawings. These latter would have been better, however drawn in line and reproduced by photo-lithography, than in tint. Tint is very well for picturesque drawings; for measured drawings it is not nearly so clear and precise as plain line drawing in black ink. Mr. Spooner's careful plan and elevation of the Nine Altars Chapel at Durham is one of the best contributions to the book; in the plan the words "scale: one inch equals four feet" should have been stopped out in the reproduction, as on the reduced scale of course they are not correct; we only mention it because we have observed that this is rather a common oversight in reproducing drawings. Fortunately there is a drawn-out scale on the drawing also, as there should *always* be; the system of merely stating the scale in the corner of a drawing is most inconvenient, and often leads to mistakes and confusion.

Among the classical (more or less) subjects we have a good series of measured drawings of Kirby Hall, by Mr. Hack; but Kirby Hall is, we must confess, rather beginning to pall upon one. The volume, in which the plates are numbered according to alphabetical order of the names of the subjects, commences with three plates of measured drawings of Clare College, Cambridge, by Mr. H. V. Ashley, including part of the exterior elevation, one of the library book-cases, and the entrance gates. These are very good, clear, workmanlike drawings, and the author is to be commended for giving sections of mouldings to a good large scale; the sections on some of the drawings are too small to be of much value; and on



Weekley Hospital, Northampton. Reduced from the Measured Drawing by Mr. R. Shekleton Balfour, in the "Architectural Association Sketch Book."

two of the plates he has given a scale with the mouldings. It is a slight defect however, that in the general elevation drawing the mouldings as put in on the small scale do not in all cases sufficiently represent the profile as shown in the detail (compare the plinth mould, C, for instance, with the large size section; also the moulding B); this is often thought of little consequence by draughtsmen, who show a moulding roughly on the general elevation and refer you tacitly to the detail section for its actual outline. This is, of course, excusable in the case of an elevation for a new building, where the precise profile of the mouldings is generally not settled till after the elevation is made; but in drawing out an existing building where the mouldings have been taken, the profiles on the general elevation ought to be put in carefully from the detail profiles, otherwise the general elevation fails in its proper object of representing the true effect and proportion of the design.

Among the classic illustrations we have to thank Mr. F. M. Kent for a very good interior view of St. Stephen Walbrook, unfortunately since the alterations, which lessens its historic value. There are one or two smaller and less important buildings illustrated which are of considerable interest. One is the Brewers Hall, London, shown in three sheets of measured drawings by Mr. Arthur Stratton; these include the woodwork details, which are worth giving though not of the first interest; we hope the design of the balusters will be taken as an example of what to avoid. The very charming simple design of Weekley Hospital, Northampton, of which the general elevation is given by Mr. Shekleton Balfour and the measured details by Mr. Forsyth, is an example of a type of building which it is very desirable to put on record in a publication like the Sketch Book, as these small buildings, hospitals and others, are not like great cathedrals or famous churches which are kept up at all costs; if they fall at all into dilapidation or become unsuitable to their purpose they are very likely to be pulled down (sometimes unavoidably), as we know too well; and therefore it is well to make an accurate record of them before it is too late; and we may suggest that this is one object to which the contributors to the Sketch Book might turn their attention. They will find some of these small and unpretending buildings are as well worth measuring and sketching, in some senses, as the larger and more famous ones; they are often admirable examples of the pleasing effect which may be gained by very simple means. We give a reduced reproduction of the elevation of this little building, about half the size of the drawing as it appears in the Sketch Book.

Among the drawings of decorative work is a very good and free one by Mr. Dods of the fine carved oak desk at Pembroke College, and an excellent by Mr. Spooner of the Prior's doorway at Ely; and the interesting gate of Bishop West's Chapel in the same cathedral is shown in a general drawing and in detail by Mr. Joass and Mr. Greenslade respectively. Mr. Masey's drawing of the font in the Baptistery at Parma is a good one of a difficult subject. The drawing by Mr. Strong of the splendid stalls in St. Mary's Lancaster hardly does justice to the breadth and grandeur of style of the work, and in the sketch section of the mouldings of the gables he has mistakenly assumed that the undercut hollows are rounded like those in stone moulding; if he had looked closer at them he would have found that they are of quite a different section, a more flat and pointed one, more suitable for execution in wood; that is one of the most characteristic details in the work.

The foreign subjects form a very small proportion of the whole, there being only one German sketch (and that is not "made in Germany," being sketches of German metal work in the Birmingham Art Gallery), and two French ones. Among the seven subjects from Italy is a view of the garden front of the Farnese Palace, which it is interesting to see in a sketch form, and illustrated in a rather more picturesque style than one generally sees applied to the more renowned Renaissance palaces of Italy. It is of course more difficult to get sketches of foreign than of English work, and there are often difficulties in the way of measuring buildings abroad which do not afflict the architect in England; but still we think an effort might be made, in the next volume, to give a larger proportion of foreign subjects.

CITY OF CHESTER WATER SUPPLY.

NOW that Parliament has thrown out the Chester Corporation Bill, the Chester authorities are face to face with a somewhat difficult problem. The history of the events of the past twelve months affords a good example of the fate of a house divided against itself.

Briefly, what has happened is this. The City of Chester draws its water from the River Dee, the Water Company's intake being about a mile and a quarter above the old Dee Bridge at a point well within the tidal influence. Chester discharges its "treated" sewage into the river below, and Eaton Hall (the residence of the Duke of Westminster), Eccleston, and several other villages deliver sewage, nominally "treated" about a mile above the intake. In fact, from its source the Dee and its tributaries receive the sewage of the district. It is not, therefore, to be wondered at that a certain portion of the leading spirits of Chester should raise an outcry and draw attention to the unpleasant results which would follow an outbreak of cholera or diphtheria amongst those now contaminating the river. The retort from the do-nothing faction was, as might be expected, to the effect that people did *not* die of drinking the water, nothing of the nature of an epidemic *had* resulted, and in fact the water was good enough for all practical purposes. The Water Company took up the position of

having the best possible filter beds, and contented themselves with pumping only at such times as the tidal water was away from their intake.

Matters however were not allowed to rest, and a scheme was proposed whereby the tidal water was to be kept from passing above the old Dee Bridge by means of a row of sluices, somewhat similar to those in use on the Thames near Richmond, and powers were to be sought to prevent pollution of the upper river by a special Bill, more easily put in operation than the existing Rivers Pollution Act. At first this proposal seemed as though it would meet the difficulty, and the Duke of Westminster announced his intention of contributing £2,000 towards the cost of the works, half the expense of which was to be borne by the Water Company. As time went on, however, the Water Company thought to avoid their contribution by opposing the scheme, and the Duke reconsidered his offer (probaby on account of the expense which he would be put to in otherwise disposing of the sewage on his property), with the inevitable result that the band of opposers rapidly swelled in numbers. When the Bill was brought before Parliament there were no fewer than 20 petitions against it, mostly based on misconceptions of what was proposed, and many of them contradictory in their contentions.

Meanwhile, the Corporation itself had become half-hearted, and only decided to proceed by a very narrow majority, notwithstanding the seriously condemning report of Dr. Bruce Low, for the Local Government Board, on the condition of the Dee water supply, which had just been published. Before the Committee of the House of Commons it became necessary to make out a case for the Corporation Bill, and thus witnesses were called condemning the water in unmeasured terms, and finally, at the request of the Committee, the Water Company came to an understanding with the Corporation, withdrawing their opposition, and thereby acknowledging the necessity for the improvements contemplated by the Bill. Up to this point all went well, but unfortunately the Committee threw out the Bill in view of the division of opinion which existed in Chester, and amongst the Members of the Corporation. This opposition was no doubt greatly due to the capital proposed to be authorised being *inclusive* of a large sum for other purposes, which made the cost of the proposed works *appear* very much greater than it actually was, which misconception was freely made use of by the opposing faction leaders.

The Chester Corporation are now somewhat in a dilemma. It is no longer possible to say the water is all right, they having been to some trouble and expense to prove it otherwise, the Water Company have acknowledged their weak position by withdrawing their opposition before the Committee, and agreeing to contribute to the proposed works; and the Local Government Board have condemned the source of water supply. So long as the tide flows past the water intake, so long will the Chester sewage run a great chance of being pumped into the mains. If the intake is moved higher up the river the neighbouring villages and streams make the operations risky, so that either the Dee water supply must be abandoned or Chester must go to the very great expense of sewage farms and their disadvantages, together with the difficult and tedious operation incidental to putting the Rivers Pollution Act in force over the considerable area affected. When the cost comes to be counted up of either of these alternatives, we think that the do-nothing faction of the City of Chester will wish that they had allowed their better informed fellow citizens to carry out the sluice project which would not only have solved the water supply problem, but also have enormously improved the river, both above and below as regards floods, navigation and salmon fishing.

We wait with interest to see what the next move will be, and how the Chester Water Company will cope with the troubles which, to a very great extent, they have brought upon themselves by their policy of obstruction.

NOTES.

Illicit Commissions.

MR. EDWARD FRY, late a Lord Justice of Appeal, has raised the last protest in the *Times* against the charging of illicit commissions. To dream of abolishing this kind of practice entirely is we fear hopeless until the world in general has risen to a much higher standard of morality than has hitherto been attained. As usual in letters in the *Times*, the practice has been represented as a common custom among architects, and readers of the *Times* have again had to be informed officially that the Institute of Architects makes it a condition of membership that no commission of the kind should be accepted. We do not however quite understand the tone of the R.I.B.A. Secretary's letter. It was perfectly right to contradict the implication in Mr. Fry's letter, but why "humbly?" There is nothing to be humble about. On the contrary, it is rather a remarkable contrast that while a well-known architect writes to say that he has hardly ever even had such commissions offered to him, a "Civil Engineer" writes that the offering of them is the rule rather than the exception in connexion with engineering work, and we are not aware that any such declaration is imposed on members of the Institution of Civil Engineers as is imposed on members of the Institute of Architects. Consequently we see no cause for humility in the matter, but rather the reverse.

Sculptures at Lagina.

As long ago as 1863 Sir Charles Newton ("Discoveries at Cnidos," ii., pl. 79 and 80) described and published four slabs from the sculptures which once adorned the frieze of the temple of Hecate at Lagina. The site has been since tentatively explored by Benndorf and Niemann in 1881-2, by Diehl and Dubois in 1880 and 1885, each time with the discovery of new fragments and inscriptions. Finally, Hamdey Bey determined, with the co-operation of the French school, on a thorough excavation of the site. The work is now complete, and the monuments have been transported to the Imperial Museum at Constantinople. The full publication of all discoveries made within the precinct will be delayed for another year, but, meantime, in the last issue of the *Bulletin Hellénique*, Mr. Chamonard, who directed the excavations, gives an interesting account of the sculptures of the frieze, of which thirty-four fragments have been brought to light. Those belonging to the west front have been put together, and the subject represented is fairly clear—a Gigantomachia—among the gods Hermes, Ares, and Apollo are clearly recognisable; Poseidon, Zeus, Hera, Athene, and Cybele with less certainty. Great interest attaches to the frieze, and is an obvious and even flagrant imitation of the great composition decorating the altar at Pergamos. Mr. Chamonard dates the restoration of the temple, for reasons too long to enumerate here, a little after the conquest, in 88 B.C., of Asia Minor by Mithridates.

The New Bridge at Paris.

THE Pont Mirabeau will be one of the finest bridges in Paris, thanks partly to the decorative sculpture by M. Injalbert with which it is to be adorned. Four figures have been commissioned from him, three of which are now in their places, and the fourth will shortly follow. The figures, which are in bronze, are on bases but little above the water level, and rise to the level of the bridge roadway. One of the figures, standing on the prow of a vessel, holds a gilt trumpet to her lips, and an oar in the other hand. The figure which forms a pendant to this holds a torch. The third figure, standing also on the prow of a vessel, brandishes an axe. The fourth, which is yet to come, will symbolise "Resistance." The sculptor has been for two years at work on these statues, which are considered to be a great success.

The Analysis of Mortar.

MESSRS. DIBDIN & GRIMWOOD, in a paper read before the Society of Analysts, and now published in the *Analyst*, tell us that the London County Council by-laws relating to the composition of mortar are sufficiently explicit to enable analysts to detect even slight departures from the prescribed quantities of the materials used; but we must confess that the paper is not very convincing on that head. The by-laws provide that the mortar used under the Building Acts must be composed of freshly-burnt lime and clean sharp sand, or grit, without earthy matter, in the proportions of one of lime to three of sand or grit. In the case of cement-mortar, the cement to be used must be Portland cement, or other cement of equal quality, to be approved by the district surveyor, mixed with clean sharp sand, or grit, in the proportions of one of cement to four of sand or grit; also that burnt ballast or broken brick may be substituted for sand or grit, provided such material be properly mixed with lime in a mortar-mill. Granted that these by-laws are explicit enough for those who are not desirous of evading them—for those who, like the authors of this paper, obtain the best of materials to make the mortar with, and so set up standards for comparison with other and poorer kinds. But if a builder were desirous of only acting up to the letter and not to the spirit of the said by-laws, he could at the same time use a mortar of very bad quality. "Freshly-burnt lime"—that is an excellent definition! How about the quality? What are to be its proportions of calcium oxide and soluble silica? Again, what is "sharp" sand? And "earthy matter"? The definitions in the by-laws, such as they are, are vague in the extreme. "Burnt ballast" may range from a red-baked clay but little better than "earthy matter," up to thoroughly burnt material resembling brick dust. The

paper is very useful as showing what bad mortars are at present in use, as compared with what might be employed; and that, in our opinion, is its chief value.

Notes on Somerset House.

WE lately adverted to the decayed condition of the ornamental stonework upon the Strand façade of Somerset House. The sculptors employed for these decorations were Carlini and Wilton (the "Ocean" and "River" heads on the key-stones of the arches, Thames front), John Bacon (statue of George III. and the Thames, in the quadrangle), Geracci, Nollekens, Banks, and Flaxman. The west portion of the Strand front was once occupied by the Royal Academy, whose rooms there are illustrated in the Rambergs' two valuable prints of the exhibitions in 1787-8. Wilton carved the bust of Michelangelo over the doorway. These rooms were afterwards occupied by the School of Design, and then by the (old) University of London Board. In the east portion of the Strand front have been housed the Royal Society, the Society of Antiquaries and the Geological and Royal Astronomical Societies. The bust of Newton was sculptured by Wilton. Chambers's design was completed in 1852-3 by Sir James Pennethorne (Wellington-street block). It is related of Telford, the engineer, that once on passing over Waterloo Bridge with a friend he pointed to the south-west corner of the river front, saying, "forty years ago I hewed and laid those stones when working on that building as a common mason." Telford in early life worked also for the brothers Adam. King's College, on the east side, founded 1828, was designed by Sir Robert Smirke; his work there was disfigured by an addition made a few years ago.

Changes in Mayfair and Marylebone.

FURTHER progress is being made with the rebuilding of that portion of the Grosvenor estate which lies between North Audley-street and Park-lane. Two blocks now in course of demolition, consist of some houses, Nos. 94-104, in Park-street, east side, standing between Lees-mews and Green-street, together with Nos. 55-9, Green-street, south side, between Hampden House and Park-street, and premises in the rear abutting upon Lees-mews and Shepherd's Place-buildings. Of the houses in Green-street, No. 59 is still to be identified by its portico and red brick front, and is that into which Sydney Smith removed from No. 33, Charles-street, Berkeley-square, in 1839; and there he died in 1845. The house was numbered 56 in his time. Thus the greater part of the east side of Park-street will have been gradually reconstructed. In Park-street lived Miss Lydia White, renowned for her "blue-stocking" parties, whom Sir Walter Scott visited there, during her last illness (1826); the Disraelis, father and son; Sir Humphry Davy; and Richard Ford, author of the Hand-book for Spain, whose collection included several fine landscapes by Wilson. The garden wall along Mount-street and Park-street of the Duke of Westminster's house has been rebuilt of red brick upon a stone base with stone piers. In the Marylebone-road, south side, a large pile of flats will be built on the ground between Baker-street and Gloucester-place; Messrs. Turtle & Appleton, of St. John's-hill, Clapham Junction, being the contractors. The demolished houses were formerly known as "York-buildings"; at the then No. 8, Leigh Hunt lived for a while after his release from Horsemonger-lane gaol.

The Foundling Hospital.

WE hear that the chapel organ has been placed for repair in the hands of Messrs. Hill. It was rebuilt and enlarged some years ago, but many of the old pipes, with the case, remain. It is commonly stated that Handel presented this organ to the hospital in 1750. But the *European Magazine*, February, 1799, expressly says that he did not do so and that the organ was constructed for the hospital governors, and at their expense, under the directions of Dr. Smith, Master of Trinity College, Cambridge (1742-68), "who added demi-tones and some of the niceties not occurring in other organs." The design of the hospital buildings is attributed to Theodore Jacobson. In the Soane Museum are prints by Jeremiah Robinson of the plan and elevation as approved at the general quarterly meeting of the governors held on Wednesday, June 30, 1742, and of a plan and perspective view to correspond. These are lettered "Theodore Jacobson, Ar. Invt., Hen. Roberts, Sculp.," and dated "July 6, 1749." On the other hand, the "Dictionary of Architecture," *s. v.*, cites an extract from the minutes: "On June 30, 1742, the plan as approved by the general court was ordered to be executed under the direction of J. Horne as their surveyor." The first stone was laid September 16 following. In the chapel vault are buried Captain Toram and Lord Chief Justice Tenterden.

The Eckmühl Lighthouse.

THIS lighthouse, which has been in process of construction for the last two years on Penmarc Point, in France, is intended to be both a striking architectural monument, and a model lighthouse with the latest improvements in machinery and lighting. The height is 63 mètres from the ground level, and 64 above high-water level. The light is to be an electric one. In the entrance vestibule of the lighthouse will be placed the statue of Maréchal Davoust, Prince of Eckmühl, and a commemorative tablet will record that the work, which will cost about 600,000 francs, has been carried out at the cost of the Marquise de Bloqueville, the daughter of Davoust. The engineer for the work is M. Proberteau, who has already carried out the lighthouses at Armen and other sites. The lighthouse is built entirely of granite. It will form one of the most important of the directing signals for vessels entering the Channel near this part of the coast.

Electric Bell Sounders.

EVERYONE knows when the electric bell is out of hearing distance the feeling of uncertainty experienced, on pressing a bell-push, as to whether the bell has rung or not. When anything has gone wrong patient people are kept wasting their time in an unenviable and ludicrous manner, while, if everything is right, impatient people do all they can to let the batteries run down by keeping the button pressed until the ring is answered. It is therefore of importance when the bell is distant that there should be an indicator on the bell-push so that the person ringing be not kept in suspense. A "Mackenzie" or other form of sounder introduced in the circuit does this perfectly, as not only does the person ringing hear every stroke of the bell repeated, but in addition a signal can be sent him that the bell is being answered. Still thrifty people may object that a sounder is as expensive as the electric bell itself, and to their consideration we would recommend the new combined bell-push and indicator described elsewhere in this issue.

Irish Rivers as Sewers.

A LONDON architect who was erecting a building in one of the principal towns in Ireland wrote lately to the town authorities for some information in regard to their sewers, in order to arrange his drains to suit them. Their reply was that the sewage might be delivered into the river which flowed through the town. The architect communicated this startling information to his client with the inquiry, "Can this be so in the British Isles in this year of 1896?" The client's reply was as follows:—

"The excuse that you are a benighted Saxon will be quite inadequate to explain your extraordinary surprise at the use made of our Irish rivers. Do you not know that the Lagan, Belfast — Shannon, Limerick—Liffey, Dublin — and Lee, Cork, are simply open sewers? The name of the "Suir" at Waterford implies—though they don't spell it our way—that the same condition of things exists there, and their candour suggests that they think it rather a thing to swagger about. As a matter of fact, the sewage fattens the fish and is an excellent food for ducks; further, the coffin industry is helped—a great thing, too, during the close season for landlords—and the doctor and sexton put in funds. Why, then, be selfish with the sewage?"

If this is not a satirical exaggeration it indicates rather a serious state of things in regard to the sanitary condition of Irish towns.

Metal-Work Exhibition, Glasgow.

IT is announced in the last circular in regard to this exhibition that it will be opened "from about October 12 till the end of that month," an announcement to which there are two objections; if the exhibition is really all that is promised it should be open longer, and a definite day should be fixed for opening: it is possible to do that in advance with proper management. The sending-in days are fixed for October 1, 2, and 3, the exhibits to include cast and wrought iron, brass and copper work, ormolu, lead, silver, or other metals capable of decorative treatment; also contributions of old examples and drawings and photographs of metal-work.

The National Portrait Gallery on Sundays.

IT is satisfactory to find from the monthly issued report of the National Portrait Gallery that the opening of that institution on Sunday afternoons has been completely successful. The trustees state that the number of visitors on Sunday afternoons is greater than on week-day afternoons. Few go to this gallery in a mere spirit of idle amusement; they may be taken to be persons who have a real interest in some form of the history of the country, and who desire to see the portraits of men with whom they are familiar in books. It is obvious, then, that the opening of the building on Sundays has ministered to the true keeping of the Sunday in its

best acceptation. Most of those who have visited this gallery would probably have spent the time there passed in absolute idleness. By visiting this building they have been brought more closely into connexion with some of the great Englishmen of past times. We have no doubt at all that those ill-judging but conscientious persons who have delayed the openings of museums and art galleries on Sundays have distinctly aided in the real desecration of the weekly day of rest.

THE CAMBRIAN ARCHÆOLOGICAL ASSOCIATION:

JUBILEE MEETING.

As the Cambrian Archæological Association this year enters upon its fiftieth year of unbroken existence—being the only learned Society connected with Wales that has ever survived to such an age—it was both natural and appropriate that it should meet at the town which witnessed its birth, namely Aberystwith, the well-known watering-place on the shores of Cardigan Bay. Meetings at crowded resorts, in the height of the holiday season, are usually neither pleasant nor satisfactory, and a repetition of the experiment is not desirable. But the peculiar circumstances attending this year's gathering fully justified the selection of Aberystwith as a centre, and the only intractable element was the weather. The name Aberystwith means the town at the mouth of the river Ystwith (or Ystwyth, which is the correct Welsh spelling of the name), but its actual situation is a tract of low-lying land to the north of the river Rheidol, which joins the Ystwyth at the point where they both fall into Cardigan Bay. In earlier times the Rheidol may have found its way into the sea at a point northward of the town, which would thus be situated between both rivers, though even then separated from the Ystwyth by high ground. However this may be, the town is now designated by a misnomer, but why or when it changed its more natural appellation is quite unknown.

The chief feature of antiquarian interest is the ancient castle, of which very few portions now remain. It occupied a piece of slightly elevated land which sloped abruptly to the sea, not far from the embouchure of the two rivers, which it effectively commanded. It has stood more sieges than perhaps any other Welsh castle, and after its last active participation in our annals during the troubles of Charles the First's reign, it was so completely dismantled by gunpowder that it exists at present chiefly in the form of immense blocks of shapeless masonry, which time and a modern Corporation are still further altering. Enough, however, remains to show that the structure was an Edwardian castle of the first order, consisting of a small inner court protected by drum towers three-quarters engaged, and by a very strong gate-house. The outer bailey was enclosed by a stout wall, which followed the irregularities of the ground, and was defended at intervals by low towers. The whole was surrounded by a moat fed from the sea. It was, therefore, not a perfectly concentric castle like Beaumaris; but its details, so far as they can be made out, go to show that it was a fortress after the type of which Beaumaris Castle is so splendid an example. Like Beaumaris, too, it had a spur work connecting it with the water's edge, where no doubt a small landing-place was also built; but the sea has made extensive encroachments in this direction which have entirely altered the line of coast. The town walls enclosed an area about equal to those of Conway, but they have long since disappeared. The main streets still retain their ancient names of Great and Little Darkgate-streets respectively, their terminal points marking the extent of Edward the First's municipality. All that great king's fortresses in Wales were intended to protect the towns he planted at their feet; and with this view, the governor of the castle was also the mayor of the town. It is quite impossible to say where the chapel of the castle was placed, or, indeed, that its walls contained a chapel at all. A church of Our Lady appears in some interesting documents of the period of Elizabeth as having not long previously been erected upon some ground just outside the castle, long since carried away by the sea, and probably not far from the spot at which the seaward end of the promenade pier now terminates. It was sustained out of the profits of a Crown mill, called Our Lady's Mill, to which the townsfolk were compelled to resort. The usual troubles arose, and ended in the eventual sale of the mill to the family of Pryse of Gogerddan, on the condition of supplying a clerk to perform service "in the church of Aberystwyth." How the church became parochial is not known, but in 1762 the mayor issued an appeal for funds for a new church on the ground that the inhabitants had been "many years ago" deprived of their church "by the sea gradually undermining it." This resulted in the building of a church dedicated to St. Michael, which has in its turn given place to a second edifice of the same name. Aberystwith, therefore, possesses no ecclesiastical building with any pretensions to antiquity. About half-a-mile from the town is a small castellated building called Plas Crug, traditionally associated with the bold Glendower, whose bed-chamber is, of course, pointed out to English visitors. It was once a good example of the fortified dwelling of some smaller baron, built probably in the late thirteenth or early part of the fourteenth century, but its downward course of degredation to its present condition of a dirty farm house has destroyed almost all vestiges of its former honourable state. It bears some resemblance to an Irish baronial stronghold, and its position upon a rocky platform in the midst of the swamps of the Rheidol must have made it a desirable residence for a Welsh or English freebooter. A very fine earthwork crowns the eminence that divides the last few hundred yards of the course of the two rivers, whose antiquity is betokened by its Welsh name, Pen Dinas; whilst its natural strength led to its occasional occupation probably until the strong castle of Edward I. put it out of date. The lines of circumvallation are very clearly marked, as is also the entrance on the southern side. No traces of water were found within the camp itself, but the prospect commanded is so extensive, and the streams flowing at its foot would always enable the defenders to supply themselves with a sufficient supply until a foray was over, that the absence of a spring was not irremediable. This camp ought to receive further attention. The late Mr. H. H. Lynes, of Worcester, who, whatever may be thought of his views on megalithic stone structures, was a careful and competent observer of fortified camps, never got so far. A good opportunity, therefore, remains for the establishment of a reputation by the scientific examination of this fine example.

On Tuesday afternoon, the 8th inst., the members visited the church of Llanbadarn-vawr, situated about a mile and a half from Aberystwith, and once the seat of the Welsh bishopric of Llanbadarn. That such a see once existed is now practically admitted by the most sceptical of church historians. It was, as it were, a wedge thrust between the existing North and South Wales dioceses, the area of its jurisdiction being clearly marked by the dedications to its founder, St. Padarn. It became extinct at the commencement of the eighth century, when it was absorbed by St. David's, which thus became, and has ever since continued, quite unwieldy. The present parish of Llanbadarn-vawr, in Cardiganshire (there is another of the same name in Radnorshire), is probably the most extensive in the kingdom, extending as it does to a distance of fifteen miles in one direction with an average breadth of six. The summit of Plynlimmon falls within its bounds. The edifice ranks third or fourth amongst the churches of Wales, and is the finest specimen of the plain but massive churches of the Principality which were built as much with a view to defence as for worship. The present building is a cruciform structure of the early thirteenth century, having been built during the period of its annexation to the Abbey of St. Peter's, Gloucester (to which it was granted in A.D. 1111 by Strongbow, Earl of Pembroke, after his conquest of Ceredigion), but after the visit of Giraldus Cambrensis in 1188. At that date the ancient Welsh organisation still lingered on, for the zealous Giraldus observes that the church was governed by a lay abbot, with a family of sons who expected to participate in the succession to the abbacy, according to the custom of the tribe of which the abbot was the ecclesiastical head. The interior is absolutely devoid of all ornamental details. The nave is Early English, or perhaps very late Transitional Norman, with single lancet windows deeply splayed. The choir has been ruthlessly restored. During the restoration which took place in 1868, some fresco paintings were discovered under the old whitewash on the north and south walls of the nave; but these, though seemingly of the highest interest, were plastered over, and have disappeared, probably, for ever. The east window is Perpendicular. The tower is low, but of great strength and excellence of proportion. The nave is entered on the south side by a deeply-recessed Early English doorway that is a manifest insertion. Tradition has it that it was brought from the abbey church of Strata Florida, and its mouldings, which correspond exactly to those found in that building, fully bear out the common report. The church contains one or two incomplete mediæval inscriptions, and a number of modern monuments—one beautiful example of Flaxman—and tablets to neighbouring families. A memorial slab to Lewis Morris, one of the ablest antiquaries of the last century, has been placed in the chancel floor by his great-grandson, the author of the "Epic of Hades"; but it is a characteristic comment upon the absolute disregard of the commemoration of the dead by the Welsh of the last few generations that it is not known whether this able and patriotic Welshman lies within the church or without. A fine sculptured, but uninscribed cross of the tenth and eleventh centuries, of which a very inaccurate drawing was given in the programme, stands in the churchyard; and, close by, is another much ruder crossed stone.

On Wednesday, the 9th, the members travelled to Strata Florida Abbey in open conveyances of the most uncomfortable sort. The weather was most unpropitious, rain falling in torrents, distant thunder making the atmosphere most oppressive, and the frequent hills rendering walking at once compulsory and burdensome. A halt was made on the outward journey at Llanilar Church, an edifice of the thirteenth century with a very fine open thirteenth-century roof which was repaired a couple of centuries later. Like all the ordinary Cardiganshire parish churches, and, indeed, it may be said, like the Welsh country churches generally, it consists of a simple nave and chancel with western tower. The towers frequently have splayed bases, the splay starting from 4 to 6 ft. from the ground level. They are almost always battlemented, and these two features combine to give them a military character, which they no doubt were intended to sustain at the date of their erection. They are often original, or, if restored, have seldom been entirely taken down. The chalice is really a Swedish silver drinking-cup, into the sides of which a number of Swedish gold coins have been inserted, and with its bottom formed of a fine silver coin of Charles XII. of Sweden. This token of conviviality was presented to the church by John Parry, messenger in ordinary to George I. and II. at the court of Stockholm.

A perfectly unnecessary visit, entailing a long and fatiguing walk, was next made to the little church of Gwnnws, in order to see an inscribed stone which has been drawn and deciphered in a way that does not call for amendment. The one point upon which a doubt may be expressed is whether the stone contains the sacred monogram Xps; at any rate, the letters, if there, are nothing like so clear as they are made to appear in the plate in the "Lapidarium Walliæ." But the stone is showing signs of weathering, and the toilsome visit of the antiquaries will, after all, not have been paid in vain if it results in the careful removal of the stone inside the church. The chalice which bears the inscription "Poculum ecclesie de Llanonose, 1574," is of silver, of the plain, deep form usual to that period, and bears signs of clumsy repair.

The village of Pontrhydfendigaid, a mile distant from the Abbey of Strata Florida, was at last reached in a torrent of rain. A goodly number went on to the abbey, where they were joined by Mr. S. W. Williams, under whose care the church was excavated in 1888. Mr. Williams has published a full account of his labours, together with a history of the abbey, under the title "The Cistercian Abbey of Strata Florida." A report of the excavations, accompanied by a ground plan and sections of the mouldings, was given in the *Builder* of October 13, 1888. It is therefore unnecessary to do more on the present occasion than to state that the party followed Mr. Williams in his admirably lucid explanation of the various features of this famous Welsh edifice with rapt attention. The abbey has become a show place for Aberystwith tourists; but, notwithstanding the danger from ignorant or foolish persons, it was gratifying to find that the ruins have not been much injured. The very interesting head-stones above the graves outside the eastern wall of the south transept have suffered by exposure to the weather, and it would be well to take some steps for their protection. The town of Aberystwith

has benefited largely by the opening-out of this additional place of interest to its visitors, and—apart altogether from the artistic and historic associations connected with the Westminster Abbey of Wales—the desirability of guarding and maintaining its remains should not be lost sight of by a go-ahead town like Aberystwith.

On Thursday the party proceeded by railway to Towyn, in the neighbouring county of Merioneth. Towyn Church is one of the most interesting, as it is also one of the oldest, churches in the Principality. It is a cruciform building with central tower. The east end, transepts, and tower may be at once dismissed from present notice; they are altogether new, having been built by the late Mr. John Pritchard, the restorer of Llandaff west front, without any attempt at recalling their former features. The tower fell in 1692, and in 1736 a fresh one was built at the west end, which probably was shortened for its erection; the second tower was removed during the last restoration. The nave is, however, pure Norman of the rudest type. Immense squat circular piers support an arcading of three arches, which once extended to a greater length westward, as the respond of another arch can be discerned on the south side. The cylindrical piers are larger than the arches they support, but whether this is original, or is merely due to the plaster with which they are covered, and which may have been roughly built up over the pier mouldings, it is impossible to say. The arches of the northern aisle have been transformed into clumsy-looking flying buttresses. The clearstory windows are very small, with rounded heads, and are placed over each pier. Altogether, this portion of the church bears considerable resemblance to the rudest churches of Normandy. The dedication is to St. Cadvan, a native of Armorica, who came over to Wales about the year A.D. 516. The Saints' Well has been enclosed within some modern stabling. What has been known as St. Cadvan's Cross, which bears an inscription that has hitherto puzzled both Cymric and English epigraphists, is preserved inside the church. The first point to determine is, What language the inscription is in? Welsh antiquaries have always considered it to be Welsh, and have made guesses at its meaning which do not bear the test of comparative criticism. An English antiquary, undaunted by the ill success of his Celtic confrères, boldly read it the opposite way and instantly found it to be good Mercian! (*Journal Brit. Arch. Assoc.*, xxiv., 170.) The field of conjecture is still open. The church also contains two interesting effigies, the first that of a knight of the fourteenth century armed cap-à-pie. It is said to represent Gruffydd ap Adda, raglot of the commot of Estimaner in the third and seventh years of Edward III., and no doubt correctly so, though the inscription has gone. The effigy is a splendid specimen of bold and faithful carving, Mr. S. W. Williams considering it to be as fine as anything of that period he had yet seen. The second effigy is that of a priest, of the fourteenth century, and, according to the late Mr. M. H. Bloxam, the only sculptured sepulchral effigy in this country (with the sole exception of the well-known recumbent effigy of a priest in Beverley Church) which shows the amice worn upon the head as a hood, instead of being folded about the neck.

On the way to Peniarth, the residence of Mr. W. R. M. Wynne, celebrated for its fine collection of Welsh manuscripts, the archæologists visited Llanegryn Church, situated in the beautiful vale of the Dysynny, and almost within the shadow of Cader Idris. The church itself is a small, uninteresting edifice, that has passed through the restorer's hands. It has a good fifteenth-century timbered roof of similar character to that of the nave at Towyn, but in some respects, especially in its massive wall-plates, superior to that example. It is, however, for its highly ornate Tudor rood loft that this little church deserves a visit. The loft is *in situ*, and though, of course, the rood is gone, the mortices in which it fitted are still to be seen. It has been carefully restored at a not very distant period, but the new work is in perfect harmony with the old. The loft is capable of containing about a dozen persons, and its adaptability as a singing gallery probably caused its retention. The side nearest the altar is most elaborately panelled and carved, and though in this respect it is open to the fault of over-elaboration characteristic of the late Perpendicular period, it nevertheless remains a very fine specimen of the carved work of the sixteenth century.

The last day's excursion, on Friday, the 11th inst., took the direction of the coast line south of Aberystwith. It was intended to proceed as far as the ancient church of Henfynyw, dedicated to Non, the mother of St. David, but the weather rendered this out of the question, and the programme had to be considerably curtailed. The principal objects of the day's journey were several inscribed stones taken from the walls of the old church of Llanddewi Aber Arth during its restoration over thirty years ago, and now in a garden at the neighbouring little town of Aberayron. Why a party of archæologists, a very few of whom could have been interested in early inscribed stones, should have been taken a distance of twenty miles to see several specimens that had been lavishly illustrated and exhaustively commented upon in the very last number of the Association's journal, is not readily apparent. The church of Llansanffraid was visited on the outward, and that of Llanrhystyd on the return journey; neither call for special comment. Both these churches, and also that of Henfynyw, have been restored, and in the course of restoration have lost most of their ancient internal fittings. Each of them contained screens, or remains of screens, which have been entirely removed.

The fonts are perhaps the oldest, as well as the most characteristic, features of the small churches of Cardiganshire. They are usually regarded as Norman, and so devoid are they of any of the peculiarities of later styles that it is difficult to deny them the term. They ordinarily have a square basin, truncated octagonally beneath, resting on four lions, or joined to the base by a moulding with tongue-shaped corners, as at Llanwnws.

The public and business meetings of the Association were held at the University College of Wales, the finest modern architectural edifice in the Principality. The evening meetings were distinguished by the absence of papers—perhaps not an altogether unwelcome, though unintentended, loss. Apart from the President's (Mr. F. Lloyd Philipps) inaugural address, which was entirely retrospective, only one paper was presented: on "The Archæological Survey of Pembrokeshire," by Mr. Edward Laws, F.S.A. The Association has formulated a scheme for the survey of the whole of Wales, an excellent start having already been made in Pembrokeshire under the direction of Mr. Laws and Mr. Henry Owen, F.S.A., in connexion with the Ethnographical and Archæological surveys projected by the British Association of Science. The scheme differs materially from that of the Society of Antiquaries, not only in its much greater completeness, but also in the scale upon which the results are to be published. The maps are to be the 6-in. Ordnance throughout—not a reduction of them, as in the Antiquaries' issue—and are to contain the particulars of every class of remains in each county, instead of being limited to the pre-Roman, Roman, and Saxon, which are the only classes shown upon the Burlington House maps. The magnitude of the Cambrian scheme will be best estimated from the fact that the prehistoric remains alone of Pembrokeshire exceed in number the entire entries on the archæological map of Kent. The cost is, of course, proportionate, and it is, therefore, highly creditable to the Cambrians that they have already practically subscribed sufficient funds to carry the Pembrokeshire issue to a successful termination. The maps and the letterpress will be separate one from the other, and abstracts of both will be printed in the Association's journal; they will also be supplemented by a complete bibliography of the county. When the work is completed, Pembrokeshire will be able to boast that "Little England beyond Wales" has completely eclipsed its larger moiety on the eastern side of Offa's Dyke.

The programme of this year's meeting, instead of being worthy of the Society's jubilee, fell far behind those of the past few years. Time was when the members were compelled to put up with a four-paged octavo circular, which gave as little information as possible. This was right enough, as members were driven to find out everything for themselves. Reform came, and since about 1890 the annual programmes have been so admirably compiled and up to date that they form excellent guides to the districts that have been visited. This year, however, a relapse has occurred. The Aberystwith programme was either too full or not full enough. It contained no information about routes, and the archæological particulars were in most cases drawn from ancient sources, in some cases were inaccurate, and in all were imperfect. Such a production is worse than useless, and met with well-merited criticism. It reflects curiously upon the antiquarian knowledge of the person, or persons, responsible for its compilation.

SKETCHES OF LONDON STREET ARCHITECTURE.—V.

HOUSES IN HANS-ROAD.

MR. C. F. A. VOYSEY, ARCHITECT.

THESE are two houses which were originally designed by the architect, Mr. C. F. A. Voysey, in conjunction with a third, which would have been No. 12, but which the building owner eventually did not carry out. It is fair to the architect to state this, as the two houses as they stand really represent two-thirds of the original design for the block. The actual No. 12, which was designed by Mr. Mackmurdo, we gave a sketch of in our issue of August 29.

THE SANITARY INSTITUTE:

CONGRESS AT NEWCASTLE-ON-TYNE.

THIS week we conclude our report of the proceedings of the Newcastle Congress of the Sanitary Institute. In our last issue we were able to give a short report of the proceedings of the various conferences which were held in the University of Durham School of Medicine, College of Science, &c., and this week we report the proceedings of the Sections.

SECTION I.—SANITARY SCIENCE AND PREVENTIVE MEDICINE.

This section opened its proceedings before a large audience in one of the lecture-rooms of the College of Medicine, Professor Corfield presiding.

The Teaching of Public Health.

The President, in the course of an interesting but mainly historical address, said, in speaking of examinations, that no man ought to be appointed an examiner in a practical subject like public health unless he had himself a thoroughly practical, as well as theoretical, acquaintance with it. What would be said if an examiner were appointed in anatomy who had never been in a dissecting-room, or an examiner in surgery who had never performed an operation, or an examiner in chemistry who had himself done no laboratory work? And yet a similar thing had been done, not once nor even twice, by public health examining bodies, though never, he believed, by the Sanitary Institute. Two things were especially required of an examiner—one that he should have as complete a command of his subject as possible; and the other, that he should try to find out what the candidates know, and not what they did not know. The first gave the candidates confidence, for every candidate knew that the best man may easily be plucked by an incompetent examiner, and the second was only fair treatment. The practice of asking questions which a candidate was not likely to be able to answer, was resorted to by examiners who felt that they were not well up in the subject, and who wanted to give the impression that they knew a great deal about it, and who had, "heaven save the mark!" to get it up for the examination as if they were the candidates; and also by young examiners, who, although they might know the subject very well themselves, had not yet learnt the very difficult art of finding out what the candidates knew, the art, in fact, of examining. A man ought not to accept the position of examiner unless he felt that he could sit down and write a suitable paper of questions on the subject, just as he would write a letter to a friend, and every examiner ought to make up his mind to ask questions which the candidates could be reasonably expected to answer accurately, and not questions which he knew, or ought to know, were beyond them, bearing in mind the old and very true saying, that "A fool can ask questions which a wise man cannot answer."

In regard to International Congresses of Hygiene, the President said that these Congresses had become too unwieldly, and some means must be taken to limit them to persons really interested in the subjects treated, and also to exclude subjects which ought to be omitted as not coming within the scope of the Congress; for example, there was no reason why there should be a section of pharmacology in a Congress of Hygiene, and such controversial political subjects as the question of the eight hours day for labour, must be rigorously excluded. The permanent committee of the International Congresses of Hygiene had considered these points, but the limitation of the number of members presented considerable difficulties, as the financial question had to be faced, and the cities receiving Congresses could not be expected to forego the means

for recouping themselves part of the expense they were put to, and the organisers of these Congresses might be expected to take a similar view. With regard to the exclusion of unsuitable subjects, Dr. Billings, of the United States, and he had made a stand at the final general meeting of the Congress at Budapest, and not only obtained the rejection of a number of resolutions relating to unsuitable subjects, but induced the Permanent Committee to include in the scheme prepared for the regulations of future Congresses one providing that all subjects partaking of a political or religious character should be excluded. While he had reserved to the last the consideration of work done by Congresses, he must not be interpreted to mean that the work done by Congresses, although very important in spreading a knowledge of hygiene throughout the world, was the most important work that had to be done. By far the most important work was that which was done in the class-room, the laboratory, and out of doors, or should he say in the courts and alleys of our great towns. It was in these places that an accurate practical knowledge of public health work in its various branches could only be acquired. The acquisition of such knowledge was a labour of years and required the devotion of a lifetime.

Earl Percy proposed, and Professor Phillipson seconded, a vote of thanks to Professor Corfield, which was warmly accorded.

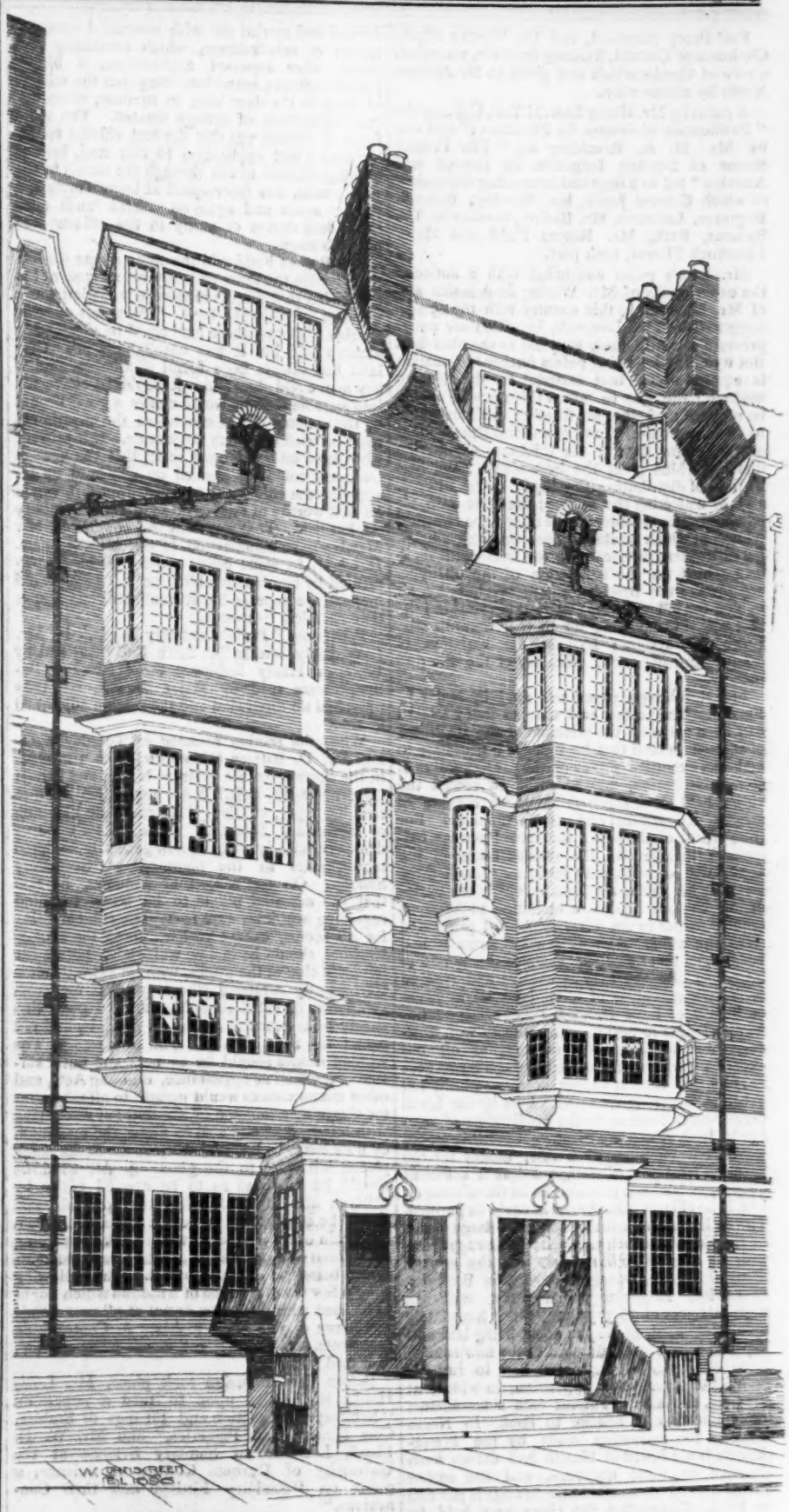
Several papers were then read and discussed.

The business of the section concluded with the reading of a paper by Sir Charles A. Cameron, Dublin, on "Some Vital and Mortal Statistics of Dublin." The paper sketched the history of recent sanitary improvements in Dublin, and proved from statistics that a remarkable improvement had taken place in the public health in consequence of those improvements. The general death-rate was still higher than in English towns, but the zymotic death-rate was slightly lower.

SECTION II.—ENGINEERING AND ARCHITECTURE.

This section commenced its labours on Monday morning, the opening address being delivered by Sir Andrew Noble, President of the Section, in the presence of Earl Percy and a large number of members of the Congress.

The President said that although an engineer he was not an expert, for he had not devoted special attention to the branch of engineering with which the Congress was more immediately concerned, but no man of ordinary intelligence could avoid noting the strides made by that branch of the science in recent years. After the passing of the Public Health Act (1848) and the Towns Improvement Act (1847) architects, engineers, and mechanics were led to devote special attention to the practical methods of ameliorating public health, and they proved to be the forerunners of the sanitary engineers of to-day—a class as necessary, as able, and as much appreciated as any in the community. Before that time no serious attention had been paid to sanitation. All was done by rule of thumb, and only when virulent outbreaks of disease forced the hands of authorities was anything done. Houses were generally badly designed from the sanitary point of view, there was, as a rule, no public water supply, and wells, the usual source of supply, were often contaminated. All was then in the stage of experiment and though there were many successes there were some gigantic and costly failures. It was by the great advances made in the last quarter of a century that England had been placed at the head of all nations in sanitary matters. Germany and France were in advance of Italy and Spain, but the outbreak of cholera at Hamburg had revealed even in Germany a state of things which might perhaps have been found in English towns forty years ago, but could certainly not be found here now. He wished he could say of his own branch of the engineering profession what could now be said of sanitary engineering that England more than held her own. In foreign hotels it was common to find notices stating that the sanitary arrangements were by such or such an English firm, which by all was accepted as a practical guarantee of efficiency. (Cheers.) None of the many problems to be solved by the sanitary engineer was more urgent than the supply of water to large towns. Here Sir A. Noble sketched the history of the waterworks of Newcastle and Gateshead at different epochs, from the earliest scheme established in 1697. A new reservoir, in course of construction, would bring the storage capacity of water at Newcastle to 5,000 millions of gallons, the present consumption in the city being 38½ gallons per head, of which 23½ gallons were for merely domestic needs. In Newcastle the great majority of houses, even many houses with rentals as low as 15*l.* a year, were fitted with baths. Public and swimming-baths were not well supported in Newcastle, and in the opinion of the President they should aim rather at the introduction of the bath in every house than the multiplication of public baths. In a district like theirs, where the industries were for the most part dirty, establishments should be provided until the domestic bath became universal, where the workmen in all industrial neighbourhoods could obtain a warm bath with the utmost degree of comfort and the minimum of cost—say at the outlay of a penny, or, better still, a halfpenny. The imperfect sanitary appliances of even thirty years ago were disseminations of foul gases through the house and a fruitful source of disease. The typhoid which scourged the families of the wealthiest in the kingdom was probably attributable to the proximity of ill-fitted closets to sleeping apartments. All that was now changed, and an outsider like himself could not fail to be struck with the evidences of anxious thought and clever design exhibited in all kinds of commonplace but necessary appliances.



SKETCHES OF LONDON STREET ARCHITECTURE.—V.

HOUSES IN HANS-ROAD. MR. C. F. A. VOYSEY, ARCHITECT.

Earl Percy proposed, and Dr. Wynter Blyth, Chairman of Council, Sanitary Institute, seconded, a vote of thanks which was given to Sir Andrew Noble by acclamation.

A paper by Mr. Henry Law, M.Inst. C.E., on the "Purification of Sewage by Filtration;" and one by Mr. H. A. Roechling on "The Present Status of Sewage Irrigation in Europe and America" led to a long and interesting discussion, in which Colonel Jones, Mr. Mawbey, Borough Engineer, Leicester, Mr. Balfour, Newcastle, Dr. Symons, Bath, Mr. Rogers Field and Major Lamerock Flower, took part.

Mr. Law's paper concluded with a notice of the experiments of Mr. Waring in America and of Mr. Lowcock in this country with the system suggested by Mr. Lowcock, in which air under pressure is continuously supplied to the filter-bed. But upon the following points further information is required:—The best material for the filtering medium; the size to which this material should be reduced; whether the filtering medium should be the same material, and of uniform size throughout its entire depth; the thickness of filtering material which gives the best results; the best method of distributing the liquid to be filtered, and of collecting the filtrate; the best rate for passing the liquid through the filter; the chemical treatment which would produce the best effluent for subsequent nitrification; the best methods to be pursued for the cultivation of the nitrifying organisms; the best method of precipitation for freeing the effluent from matter in suspension; the best way of supplying air to the filter on Mr. Lowcock's system; how far the variation of temperature affects the efficiency of the filtering process.

Mr. Roechling's paper was read by Major L. Flower. The author said that so many attacks had been made on the principle of the treatment of sewage on land that he thought it necessary to make an extensive survey of the present status of sewage irrigation, and to place on record the views held concerning it by those capable of forming independent and reliable opinions. For the purpose of the paper the term "sewage irrigation" included all the various forms of the application of sewage to land, as though these forms might differ, the laws by which the purification of foul liquids containing nitrogenous organic matter in the pores of the soil proceeded were the same. Against sewage farms it had been urged that as sewage contains the germs of infectious diseases, such as cholera and typhoid fever, the spreading of it on land might cause outbreaks of these diseases, hence sewage farms were a danger to health. This theory was, however, not supported by practice, as all our experience with well-managed sewage farms goes to show that such a danger does practically not exist. Concerning the opinion held by our Local Government Board as to the application of sewage to land, it was well known that this Board would not sanction, as a rule, money for the chemical treatment of sewage unless a sufficient quantity of land was provided for in the scheme on which the effluent from the works could be purified. The author then mentioned various large farms on the Continent such as the Berlin sewage farms with an area of 22,881 acres, and the sewage farms of Breslau, Danzig, Freiburg in Breisgau, Brunswick, Magdeburg, and Paris, with an aggregate area of 36,375 acres, which have lately been established, or are just about being laid out. Especial interest was attached to the new sewage farms of Paris, as they have had to run the gauntlet of a very fierce opposition, in which, at one time, the late M. Pasteur took sides against the application of sewage to land. In North America the researches made by the Massachusetts State Board of Health had drawn fresh attention to these questions, and the author quoted several towns where the sewage is purified on land. Concerning the views now held by some on the question of sewage treatment, the author mentioned both chemists and bacteriologists who have pronounced in favour of sewage irrigation. The paper concluded as follows:—"Whilst the author does not wish in the least to discourage other methods of sewage treatment, he believes to have shown that a one-sided condemnation of sewage irrigation is not supported by general established facts, but that, on the contrary, these facts are very strongly in favour of the principle of the application of sewage to land."

Mr. E. G. Mawbey, Borough Engineer of Leicester, in the discussion which followed gave a sketch of the difficulties encountered in the experiments at Leicester and of the way in which they had been overcome. Taking advantage of the steep falls which the site presented, he had devised and carried out with successful results a system of sub-drainage, which eventually produced, after repeated applications, a highly purified effluent, notwithstanding that the volume of water in the river was, in summer, often less than the volume of sewage treated. The main factor of success was that the foul effluent resulting from a first application to clay land, instead of being allowed to run through the drains to the watercourse, was intercepted at lower levels and run out again and again on to fresh lands until the desired degree of purity in the effluent had been obtained.

Mr. Rogers Field said the more a man studied the question the more certainly he arrived at the conclusion that success in sewage irrigation was a question of suitable land. There was a large number of towns where land could be obtained at a cheap rate but it was unsuitable land. Clay land had always been found unsuitable, and if any man could show how it could be converted into suitable land he would confer a great benefit on the nation. To be conclusive the experiment must be tried on a very large scale. If it proved, when tried on the largest scale, that the sewage treatment could be applied on clay land by re-applying the effluent from land drains, it would be well worthy of the attention of Local Sanitary Authorities. That was why he considered Mr. Mawbey's communication of the highest value. It might, in some cases, require to be supplemented by constructing filter beds, which would increase the expense but it would still be cheaper than chemical treatment.

Papers on "India's Sanitary Needs," by Mr. J. W. Parry, late Indian State Railways, and by Professor Henry Robinson on "River Pollution," were read by Major Flower, but they provoked no discussion and the section adjourned at 1.30.

When the section resumed on Tuesday morning, Mr. D. Balfour (Newcastle) took the chair in the absence of Sir Andrew Noble, and Mr. J. Osborne Smith, F.R.I.B.A., was called upon to read his paper, entitled, "Notes on the Planning of Secondary Schools." The author's paper dealt very clearly with the now generally-accepted requirements in the planning of Secondary Schools. On the subject of windows, he said that the essential points to be borne in mind regarding windows were:—1. The chief lighting for *all* rooms, except perhaps those for science teaching, should be in one wall only, that on the left hand side of the pupils, with an extra window conveniently arranged where possible for cross ventilation or extra sunlight. 2. The glass line should be as near the ceiling as possible, and not nearer the floor than 3 ft. 6 in. or 4 ft. 3. The window frames should be as near the outer surface of the wall as appearance, Building Acts, and other circumstances would permit, to afford means for obtaining admission of air without interfering with blinds, &c., and also to allow the maximum of floor space to be used without the desks being placed too close to the glass. 4. All windows should be made so as to be opened easily by children and to the fullest extent possible, and should be constructed to permit portions of them to remain open if desired while work was going on without the possibility of downward currents of air being felt by the pupils. The following were a few familiar kinds of windows which ought to be used with discretion or not at all:—*a*. Wide and heavy double hung sashes. *b*. Centre hung casements. *c*. Folding casements hung at side. *d*. Fixed sashes.

Before the discussion took place, Mr. Louis Hanks was called upon to read a paper on "Sanitary Construction and Fittings of Stables, Cow Houses, and Piggeries," and Mr. W. E. Bland, Lecturer on Sanitary Science at the University of Durham College of Science, a paper on "Sanitary Fittings and their Connexions."

Sanitary Fittings.

The leading points of Mr. Bland's paper were the following:—Endeavours should be made to arrive at consistency of opinion among experts and Sanitary Authorities. While the authorities of some towns recommended fittings condemned by others, cheap and useless fittings dangerous to health were being put into even the newest buildings. The disconnexion of house drains from the common sewer, and the ventilation of the latter by means of iron shafts which he thought might be put up the sides of churches and chapels, were strongly advocated. Nothing had been more uniformly condemned by sanitary experts than common putty joints to drain pipes outside buildings, and yet 75 per cent. of the joints *inside* houses were of that faulty description. Great progress had been recently made by manufacturers in constructing baths, lavatories, and closet fittings free from casings or woodwork. In the arrangements of the kitchen, the sink and its connexions, there was room for much improvement. The appointment of a Central Board of Health was advocated, to which should be relegated all matters relating to sanitary construction, and which could make by-laws for the guidance of Sanitary Authorities. By some such means only could they hope to see anything like uniformity of practice in sanitary matters throughout the kingdom. The staffs of all Local Authorities should be strengthened by attaching to them trained and qualified sanitary engineers, who should be paid on such a scale of remuneration as would keep them clear of local influences.

Dr. Herbert Jones (Crewe), with regard to Mr. Osborne Smith's paper, said he did not think it a very important matter that the windows should be on the left, because reversible desks could always be used. He should like to have heard something said in the paper about the construction of schools and about playgrounds. Where a playground was covered with ashes they got very dirty and the dirt was brought into the school-room. The surfaces of playgrounds should be formed of a hard, impervious substance. There was no mention of electric light in the paper, nor of electric fans, so useful for instantaneously clearing school-rooms of foul air.

Rev. P. C. Fortin (Lanchester) entirely agreed with the views of the author of the paper with regard to the windows being on the left side only. The windows should certainly be either on one side or at one end, should go right up to the ceiling, and above all they should never be glazed with clouded or obscured glass. It was not so easy to change the desks about as appeared to be thought, unless they had a great crowd of teachers.

In regard to Mr. Bland's paper, Mr. Moss Flower (Bristol) objected to the proposal to put ventilation pipes up the sides of churches. He agreed that all inspections should be carried out by men of practical experience.

Mr. Rogers Field said that Mr. Bland had asked why we had so few good by-laws, and why they were not better enforced? He thought it was because Sanitary Authorities did not see their importance. On the question of cast-iron pipes for ventilators and also for drains, he (Mr. Rogers Field) had for the last twenty years used iron for houses, but stoneware for large institutions, but he had often found even where there was no fault in laying, that after the lapse of six, eight, or ten years, a stone-ware drain sometimes became defective, but in no single instance had he found that the case with iron pipes. Why should they go on using stone-ware pipes for large institutions? The difference even in first cost was no so great as might be supposed, since they could be laid in much longer lengths. Instead of lengths of 2 ft. as in stone-ware, they could have lengths of 9 ft. in iron.

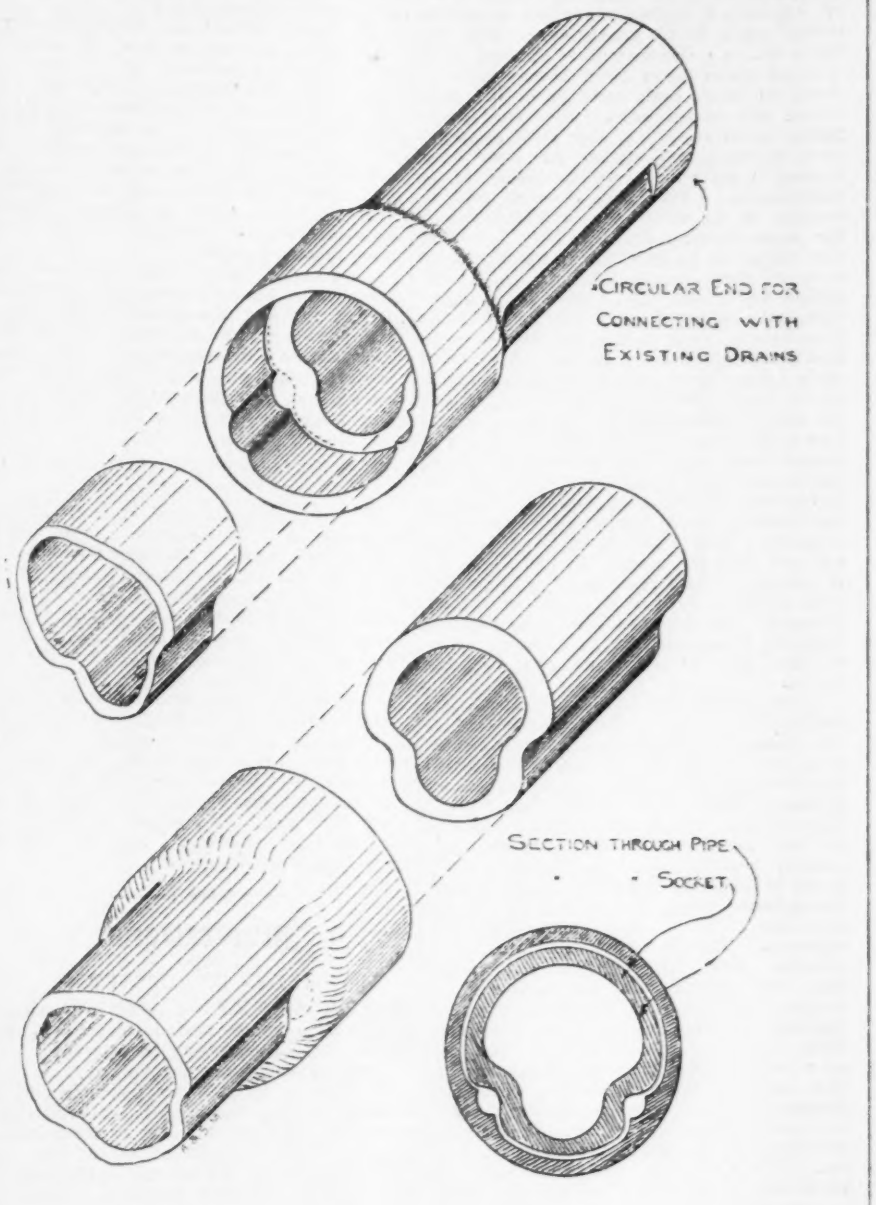
Mr. A. Dunn (Architectural Association) could not agree to some of the observations made by Mr. Rogers Field. He thought iron pipes instead of stoneware would not prove an advantage in the end. He thought they would not last so long. Some stoneware pipes, after being buried for centuries, had been found as fresh as when they were put in, and that was not possible with iron. Defects caused by settlement could be obviated by putting a bed of concrete under the stoneware pipes. We used far too much iron in building bridges and many other structures, and it was much to be feared that in 100 or 200 years all would have to be rebuilt to prevent them coming down.

The three readers of papers were severally called upon to reply.

Mr. J. S. Brodie, A.M.I.C.E., having read a paper on the "Ventilation of a Church," in which he gave details of the ventilating arrangements carried out at Holy Trinity Church, Whitehaven,

Mr. A. B. Plummer, F.R.I.B.A. (Secretary of the Northern Counties Architectural Association), read his paper on "The Diameters and Inclines of Drains, and the Flush, &c., necessary for Household Purposes." He said that in March of this year, as Hon. Sec. of the Northern Architectural Association, his attention was drawn to the fact that the Newcastle and Gateshead Water Company were again requiring in their revised regulations (then issued), that service cisterns in connexion with water-closets should not allow of a flush of more than two gallons. He was desired to get up a memorial amongst architects and others requesting that four gallons might be allowed. Previous to taking any further steps he called upon Mr. Smith, the Secretary, who directed his atten

tion to the excellent fittings and cisterns recommended and used by the Company. With the use of such fittings it was reasonably maintained that a two-gallon cistern was all that was necessary for flushing purposes within a residence, and it was mentioned that water companies were not required to provide water for flushing drains outside a dwelling but simply for domestic purposes. The representatives of the Water Company next invited Mr. Leeson and himself to a further interview at the Manor's Yard, and thereupon arranged to fit up various cisterns and water-closet fittings, and lengths of drains for their further private inspection. He made a number of experiments and tests in connexion with the various apparatus then fitted up. There were two lengths of drain laid (each about 83 ft. long). One length was formed of 6 in. drain pipes, with a fall of 1 in 40, and having a Buchan trap at 19 ft. from where the drain gradient commenced, and with an obtuse bend at 12 ft. from the discharge mouth of the drain. The second length was formed of 4-in. glass lined pipes, with a fall of 1 in 60, and having a Buchan Trap at 6 ft. from the start of the drain gradient, with a right angle bend at about 12 ft. from the discharge mouth of the drain. Various water-closet apparatus were fitted up in connexion with these two lengths of drain, and were placed at heights representing the ground and first floor levels of a dwelling-house. They first tested the 6 in. drain with a ground floor Shanks' 2-gallon flush syphon cistern with a 1¼ in. flush pipe. The distance from the water line in the cistern to the top of the wash-down basin was 3 ft. 8 in., and from the top of the basin to the bottom of the pipe where the drain gradient commenced was 3 ft. 8 in. A mixture of soft soap and sawdust weighing 10½ oz., and without paper, was placed in the basin. The first flush cleared the basin, but it was not till the sixth flush that half the charge came out at the drain, and at the eighth flush the remainder came out. They carried out eight other similar courses of tests with various flushes. They noticed from the foregoing tests that although the 4 in. drain was not of so steep a gradient as the 6 in. pipe, and although it also had a much more acute bend in it, the result of these experiments was decidedly in favour of the smaller drain-pipe. It might be taken for granted that no water company would desire to supply less water for flushing purposes than such an amount as might be the minimum quantity necessary. It would be undoubtedly penny wise and pound foolish to supply too small a flush, as in such a case two or more flushes would be found to be necessary, and would undoubtedly be used by consumers instead of one of adequate amount. Now that pedestal closets were being universally introduced, and were used at all times and for all sorts of household purposes, the much greater amount of water wasted and used than was formerly the case, became a matter of serious consideration for any water company. He was clearly of opinion that all syphon cisterns were a mistake so far as water companies were concerned, and they were not necessary from other points of view. Of course, in the case of syphon cisterns, the full amount of the flush—say two gallons—was obliged to be used upon every occasion, whereas with other cisterns only half a gallon could be used if desired, and in many instances might be all that was necessary; on other occasions it was, however, quite indispensable that the handle should be pulled till the full two-gallon flush was obtained. Various architects had for long been convinced that many Local Authorities often compelled drains to be laid of unnecessarily large diameters in connexion with private properties, and had felt that if only such Authorities could be convinced that such was the case, it would be a decided advantage. If the water companies' experiments helped to prove that drains of as small a diameter as necessary were more easily flushed and kept clean with a minimum flush than drains of an unnecessarily large diameter (which more easily choke up and become foul), they might reasonably expect that some good would be the result of the experiments. The by-laws of the various Local Authorities in the north of England practically left the question of the diameter to the discretion of such authorities. It was generally stated that "the drains are to be placed in positions, of such size and of such materials, and at such levels as may seem to the Council sufficient for the purpose of effectually draining the same," or else it was stated that "every drain shall be of adequate size, and if constructed or adapted for conveying sewage to have an internal diameter not less than four inches." It seemed to him to be desirable that the maximum as well as the minimum size of drains should be stipulated and considered, and that a regular scale of sizes of drains should be drawn up and included in the by-laws (as in the case of the various thicknesses of walls), if such scale were not binding in every case it would, at any rate, be able to be referred to as guide by any council or architects as to how they should use their discretion. He was of opinion that two gallons was sufficient for satisfactory sanitary apparatus, but not enough for flushing large drain pipes laid to a gradient of from 1 in 40 to 1 in 80; of course, many cisterns, nominally two gallons, contained both more and less than that amount. If consumers obtained water by meter, they could, of course, have a larger flush, and in certain cases this might be necessary, or else by some means they should have drains of a size and incline, &c., that could be flushed with the company's allowance of water. On August 11 a new series of tests were commenced, when four 82 ft. lengths of drain were laid to a gradient of 1 in 40, and alongside each other, viz.: 6 in. and 4 in. sanitary pipe drains, and 4 in. and 3 in. glass-lined metal pipes. Each length had an almost right-angled bend at 12 ft. from the mouth, at a further distance of 4 ft. there were Buchan's traps in the 6 in. and 4 in. pipes, and a Dubois' rap in the 3 in. pipe, at a further distance of 8 ft. there were four junctions in connexion with yard conveniences, 38 ft. beyond the drains were connected with four soil pipes, each having connexion with ground and first floor water-closets. All the cisterns were two-gallon, with 1½ in. flush pipes and Hopper basins. They started to experiment with the 6 in. drain by charging the top floor water-closet with a 6 oz. solid mixture of soft soap and sawdust, &c., as before, and flushing with two gallons; the same thing was next done in connexion with the ground floor closet and then with the yard water-closet. They commenced again and continued in rotation as before till each of the three closets had been flushed and charged twenty times; after the fourteenth round the drain was entirely blocked. Of twenty-two and a half pounds put in only seven passed out. Considerable force was necessary with a hose-pipe next morning to clear this drain out again. Similar experiments in connexion with the 4 in. sanitary pipe resulted in the charge passing much more freely through it till a stoppage took place at the end of the sixth round, and again a very considerable flush was necessary to clear the drain. In the case of the 4 in. metal pipes the results were satisfactory, and the 3 in. metal were even more so, each charge practically came direct through the drain with each flush, and it therefore became unnecessary to again test this drain under less severe circumstances. It must be remembered that in allowing a two-gallon flush, the Newcastle Company were only doing what almost all other companies in the kingdom do (who gave the matter much consideration) with the exception of Southend, where a two and a half gallon flush was conceded. This also was the case with Bradford where there was (or is) a three-gallon flush. It would perhaps be possible satisfactorily to meet the requirements of water companies, and the present demands of



Form of Drain-pipe suggested by Mr. A. B. Plummer for soil-drains, for clearing adequately with a small flush of water.

Local Authorities, by having large drains of a V or egg-shaped section. Another satisfactory course would be to convey waste water from baths, &c., to a flushing tank at the head of the drain, or where wastes could be conveyed direct there, no better flush could be desired under almost any circumstances. They conducted a further series of tests at the water company's yard, allowing consideration for other water flowing in the drains between the use of the water-closets. The closets were therefore charged in the same way as before, and in the same rotation, but after each flush with the charge in it, each cistern was discharged a second time into the drain simply as water without any charge. In no case was this second flush of the nature of a four-gallon flush at one time, because the first flush was allowed to be cleared through the drain, and the cistern to fill again before the second was discharged into it. In the case of the 6 in. drain the second flush had the effect of preventing the stoppage, as was the case in the former tests, and the 4 in. and 3 in. pipes worked satisfactorily. A third series of tests, similar to the first, was conducted with a two and a half instead of a two-gallon flush, with the result that the 6 in. pipe now worked satisfactorily, and it therefore became unnecessary to test the 4 in. and 3 in. pipes in this way. He (the author) was of opinion that wash-down closets were the best from a sanitary point of view, and for flushing purposes. The lecturer exhibited some diagrams, including a suggestion for an improved section of drain pipe of which we give an illustration.

In the discussion which followed, Mr. Rogers Field said he could not quite make out the line Mr. Plummer wished to adopt. First, he wanted more than a two-gallon flush, and then he showed how to do with a two-gallon flush. The Sanitary Institute looked at the question from a public point of view. We should have good sanitation and we should have sufficient of flush under ordinary conditions, and if it was not enough it should be increased. Twenty years ago he thought two gallons enough, but he had come to the conclusion that a three-gallon flush was necessary. The Sanitary Institute, too, went carefully into the question and found that two gallons was not sufficient. A London County Council inquiry in which he had taken part also came to a similar conclusion. What they wanted was to find out what took place under ordinary conditions of practice. If they had a two-gallon cistern they would find that not two gallons went out, because the ball-cock must be above the overflow. The ball got bent down and then less than two gallons were let out. With a nominally three-gallon flush they would only get two and a half gallons. Water companies only gave a two-gallon flush, but all Local Authorities who had control of the water gave more. He did not agree with the author of the paper in calling upon the companies to flush a main drain. It was not reasonable to expect it. They must have other means for flushing main drains, but house drains should be flushed from the cistern. With regard to new forms of drain-pipe, he thought they could not reasonably call upon people to alter their existing drain-pipes to the form proposed by Mr. Plummer merely in order to accommodate a two-gallon flush.

Mr. Osborne Smith said he had listened to the paper with a great deal of interest. The difference between the 6 in. pipe and the 3 in. pipe was very striking. It was surprising to find that under similar tests the 6 in. pipe clogged, while the 3 in. flushed everything. It was a move in the right direction to stick to small pipes. It was clear that a two-gallon flush was not so bad a thing as it appeared to be. He had charge of an establishment where the closets were used very frequently. It would be very inconvenient if there was a large flushing tank to fill. He found a two-gallon tank filled rapidly and answered the purpose, but he could not get a three-gallon tank to fill rapidly enough.

Mr. W. E. Bland (Newcastle) wished to put on record the fact that the Glasgow County Council had come to the conclusion that a two-gallon flush was not sufficient and now allowed three gallons. Thus the tendency in one of the most important towns of the kingdom was upwards, not downwards.

Mr. Hooper (Architectural Association, London) said he ventured to think that the experiments which had been brought forward were of a higher character than Mr. Rogers Field allowed. Anything that would reduce the volume of water wasted should be esteemed meritorious, and if Mr. Plummer could manage by an improvement in the form of pipes to make a smaller supply suffice he deserved more thanks than those who advocated an opposite course.

Mr. Mance (Belfast) said the whole tenor of Mr. Field's speech was to show the uselessness of Mr. Field's experiments of two years ago. He had gone from two gallons to two and a half and then to three gallons and probably next year it would be four gallons. He (the speaker) had charge of many miles of drains and he found that they stopped up a very few yards from the opening. This showed the necessity for a better form of pipe. Disconnecting traps were a delusion and a snare where there was not sufficient water to send matter through.

Mr. Plummer being called upon to reply, admitted that his tests were not equal to actual practice, and that in a greater number of cases than he had supposed more than two gallons were supplied. Since the companies had fixed upon a two-gallon flush, why should they not in future drainage work try to get over the difficulty?

The business of the section concluded with the usual votes of thanks.

SECTION III.—CHEMISTRY, GEOLOGY, AND METEOROLOGY.

Mr. Dines (Meteorological Society) delivered an address on "The Causes of Climate and its Effects," and papers by Dr. Percy Frankland on the "Bacterial Examination of Water," by Dr. Thresh on "Village Water Supplies," by Mr. Cooper (Wimbledon) on "Underground Water," and by Dr. A. L. Gillespie (Edinburgh) on "The Effect of Cold Weather" were read and discussed. The closing meeting took place in the afternoon, when votes of thanks were passed to Earl Percy, the Mayor and Corporation of Newcastle, the heads of colleges and others who had rendered services to the Congress. In the evening Sir Charles Cameron, M.D., Dublin, have a most interesting popular lecture in the Town Hall on "Why, When, and What we Eat," the Mayor presiding. This concluded the proceedings of the Congress.

Illustrations.

ST. DAVID'S, EXETER.

THE design for this church was selected in a recent limited competition, Mr. James Brooks being the assessor.

Accommodation is provided for 840.

The form of the plan was determined by an absolutely limiting boundary line, beyond which no portion of the building was permitted to project, a condition which led to an unusually interesting problem, soluble only by the employment of pierced internal buttresses. This condition also determined the somewhat unusual planning of the west end, and the porches generally.

Access to the belfry and organ are obtained by staircases on either side of the east end of the building, which also suggested canted angles to the eastern terminations of the chancel and morning chapel.

Advantage is taken of the fall in the ground to place the choir vestry and singing school beneath the chancel.

The drawings were exhibited at the last Royal Academy Exhibition.

NEW PREMISES FOR THE UNIVERSITIES' MISSION TO CENTRAL AFRICA.

THIS building is being erected in Dartmouth-street, Westminster, and contains the offices of the Society, a committee-room on the first floor, and rooms for the secretary on the second floor. In the basement are packing and store-rooms, and on the top floor a housekeeper's residence.

The materials are stockbrick and stone and Westmoreland slate roof. The panel in the centre of the front of the building will be carved.

The contractor is Mr. A. J. Bateman, of Ramsey, Hunts. GERALD C. HORSLEY.

YORK WATER-GATE:

MEASURED DRAWINGS.

THE measured drawings of this well-known architectural monument of old London are by Mr. W. R. Mosley.

He has included on the drawing the common ascription of the design to Inigo Jones, in regard to which we need only remark that while there is considerable reason to attribute the general design to him, there will always be a certain degree of doubt as to the precise part which the great architect had in it, on account of the decided statement in the account book of works done by Nicholas Stone (Soane Museum), "the water gate att Yorke house he dessined and built." From the employment of the same word in regard to some other buildings which Stone certainly did not "design" in our sense of the word, it seems probably that by "dessine" he meant making out working drawings; in that case Inigo Jones may have made merely a sketch, from which the working drawings were made. The general style of the design is quite in accordance with the idea that it emanated from Inigo Jones, but it will probably always be a vexed question.

COMPETITIONS.

RECONSTRUCTION OF NORTH BRIDGE-STREET, EDINBURGH.—The awards on the competitive plans for the reconstruction of North Bridge-street, Edinburgh, which will involve an expenditure of about £200,000, excluding the cost of sites, have been made by Mr. A. Waterhouse, R.A. The first premium of £250 goes to Messrs. J. W. Scott & J. H. Williamson, Edinburgh; the second, £150, to Messrs. Gibson & Russell, London; and the third, £100, to Messrs. Lanchester, Stewart & Riccards, London. The features of the successful plan are (1) a series of shops to North Bridge-street, High-street, and Cockburn-street, all the flats above the street floor being offices or warehouses—all lighted from the outside; (2) an arcade of shops forming an access from Cockburn-street to North Bridge-street, retaining the present access, and obtaining a number of shops, which will yield revenue; (3) a hotel at the corner of Market-street and the Fleshmarket-close; (4) a fruit market, urged from a financial point of view. It is also urged that space may be utilised for storing fruit. New buildings at Jeffrey-street and Carrubber's-close, all arranged as separate warehouses. The total cost is estimated at £172,862. 13s. 3d.—*Glasgow Herald.*

PROPOSED CLUB BUILDINGS, PADIHAM.—Mr. Beaumont, architect, of Manchester, has, according to the *Burnley Gazette*, given his decision in reference to the competition for the proposed new buildings of the Padiham Liberal Club as follows:—First (25*l.*), Messrs. Hitchon & Pritchard, Manchester-road, Burnley; second (10*l.*), Mr. Quarmby, Burnley. It might be stated that both the winning architects estimate the cost of the building to be 2,900*l.*, which thus comes within the stipulated figure. The first premium of 25*l.* will merge in the remuneration if the architect be employed to carry out the work. In their instructions to the architects the committee stated that a preference would be given to the most economical design consistent with efficiency, and they suggested the avoidance of all expense in unnecessary architectural display, and the securing of the most efficient means of ventilation and warming the rooms. The plans provide for the erection of a caretaker's house at the back of the premises. Provision is made for an assembly-room, to seat about 400 persons.

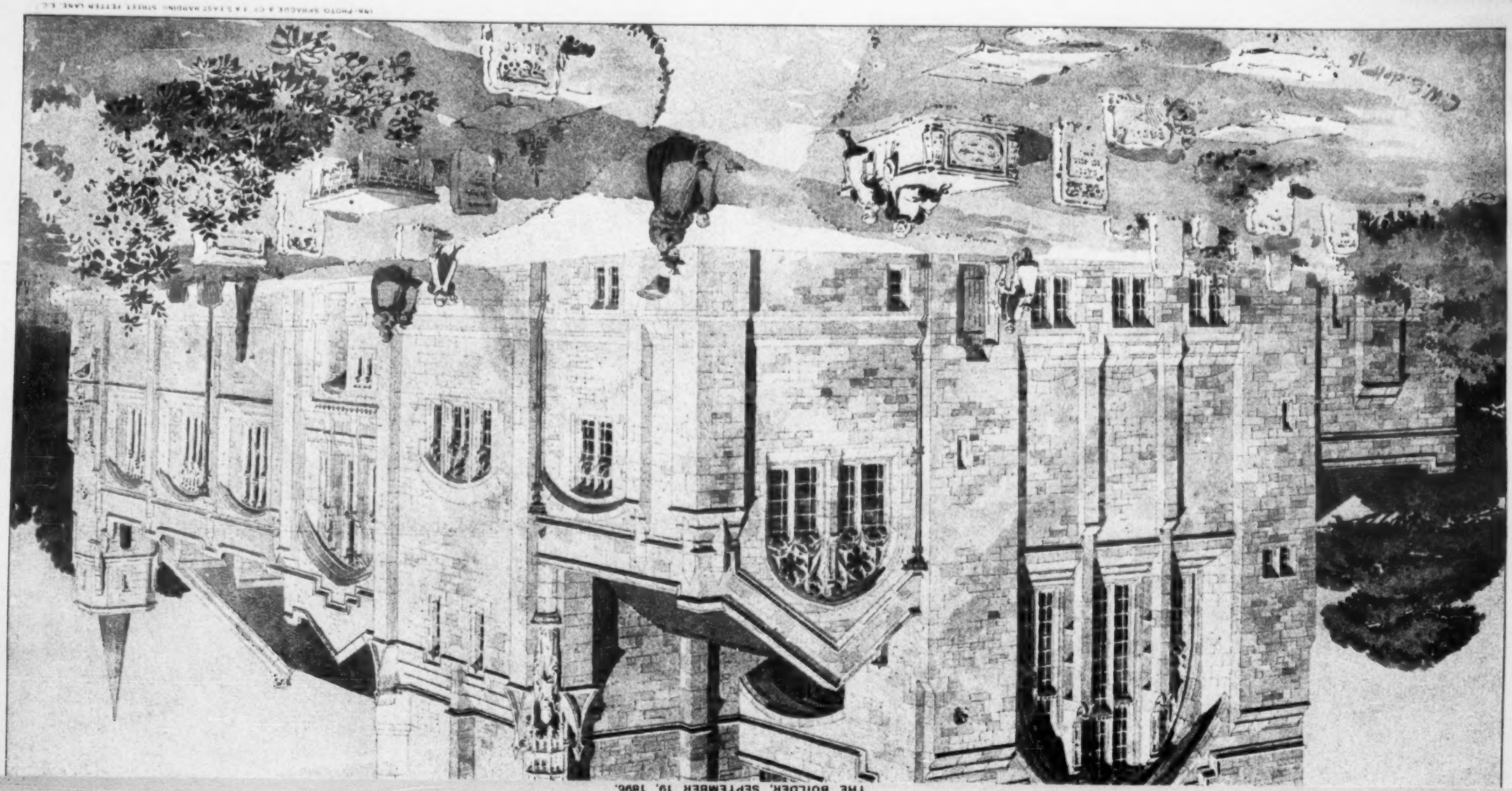
NATIONAL ASSOCIATION OF SLATE MERCHANTS AND SLATERS.

THE fourth annual congress of this Association was opened at the Masonic Hall, Llandudno, on Monday, the 7th inst.

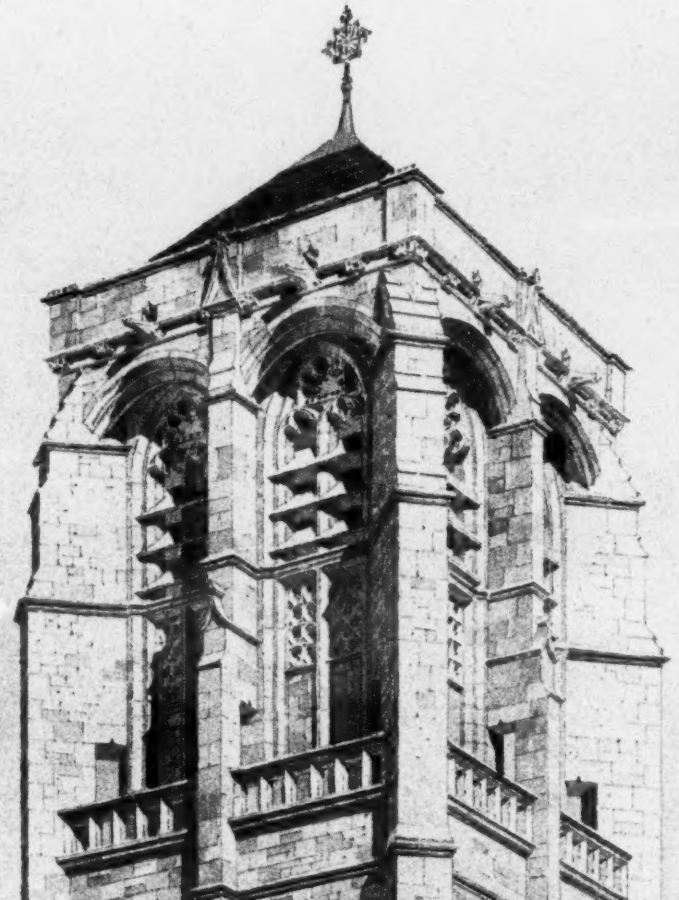
On Tuesday morning the members proceeded by train to Blaenau Festiniog, where they were met by a large number of gentlemen interested in the slate trade. They then divided into groups to inspect the different quarries, 60 going to the Oakeley quarries, 30 to Llechwedd, 20 to Maenofferen, 20 to Votty and Bowydd, 15 to Cwmorthin, and 10 each to Craig Ddu and Diphwys. At the Oakeley quarries a special train of slate trucks awaited the party, which conveyed them through a long tunnel to a floor where they were shown the method of blasting the rock in order to obtain blocks. From this floor they were taken to the pumping chamber underground, containing machinery for pumping the surface water which percolates through the rock and penetrates to the lower floors, and in the absence of pumping would soon swamp the whole works. The visitors subsequently proceeded up the shaft fawr, as it is called, to a considerably higher elevation than when they entered the works. After watching the splitters, sawyers, and dressers converting the raw blocks into marketable roofing slates, they adjourned to luncheon provided by the quarry authorities.

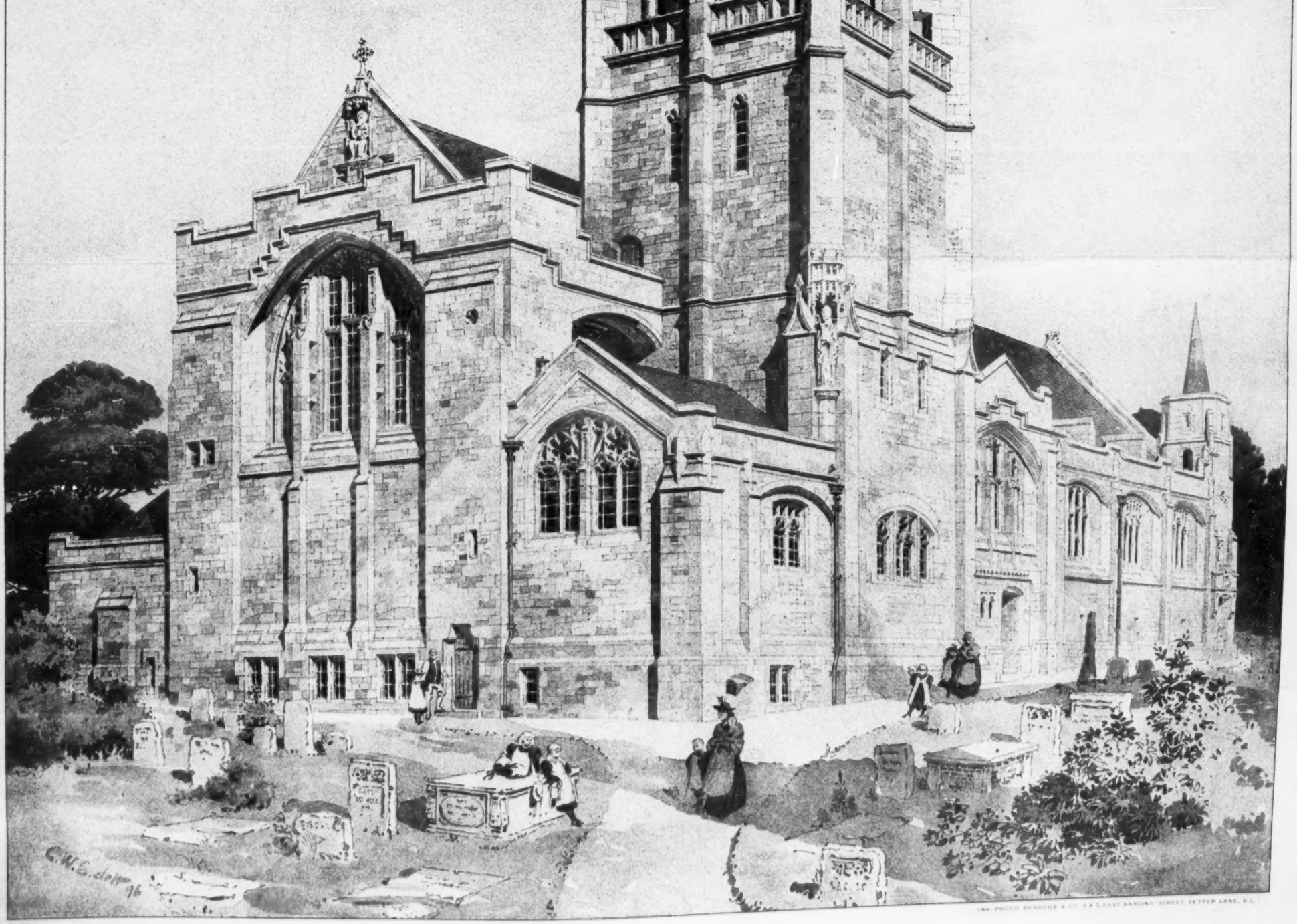
Later in the day the members travelled from Festiniog on the well-known narrow-gauge railway to Portmadoc, where they were shown over the wharfs and shipping. In the evening a dinner was

INK-PHOTO, SPRAGUE & CO., 24 & 24½ EAST MADISON STREET, PRETTY LAKE, ILL.



CHURCH OF ST. DAVID, EXETER
EXTERIOR FROM NORTH EAST
W. D. CARÖE, MA ARCHT.

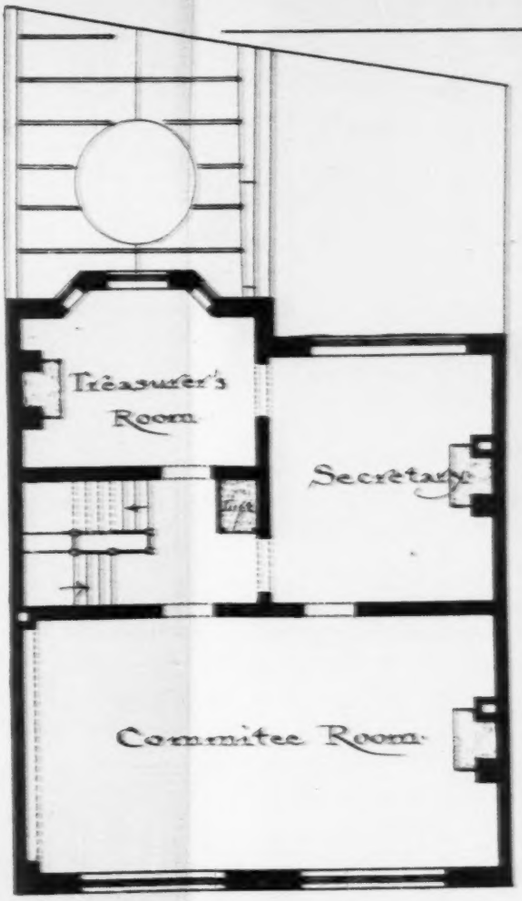




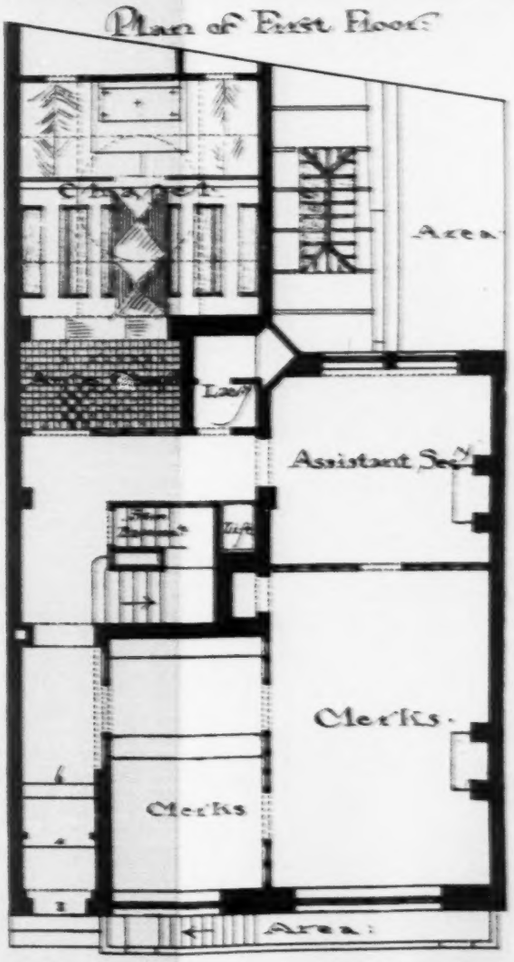
Nave
Choir
Morning Chapel
Font
Pulpit
Reading Desk
Organ
Accommodation 800
Choristers 50
CHURCH OF ST DAVID,
EXETER. INTERIOR.
W.D. CARÖE M.A. ARCHT.

INK-PHOTO, SPRAGUE & Co. 44 & 5 EAST HARDING STREET, FETTER LANE, E.C.

UNIVERSITIES' MISSION TO CENTRAL AFRICA:
Design for New Premises: Dartmouth Street: Westminster:
Gerald C Horsley: Architect:



Plan of First Floor.



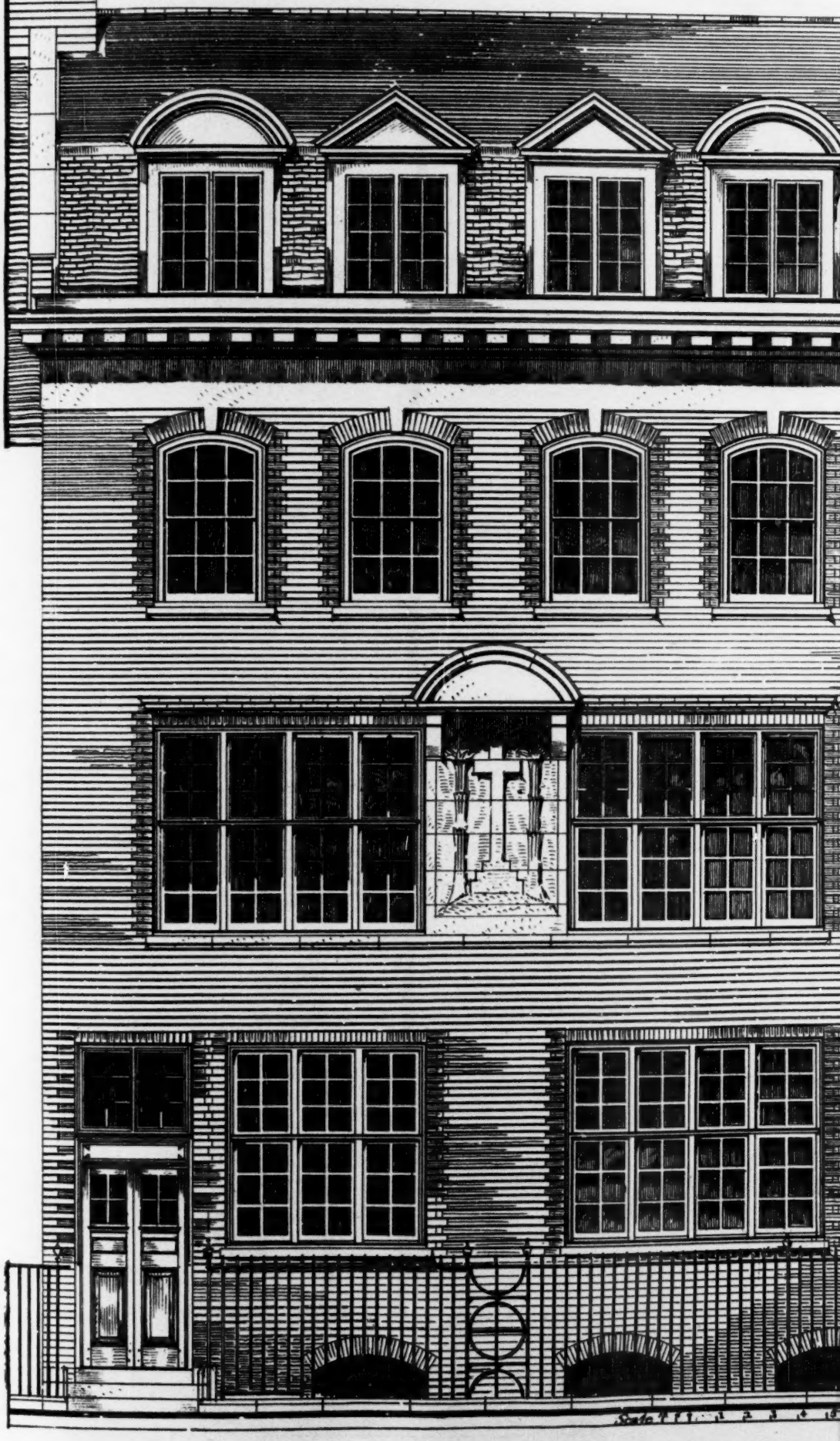
Plan of Ground Floor.

SCALE

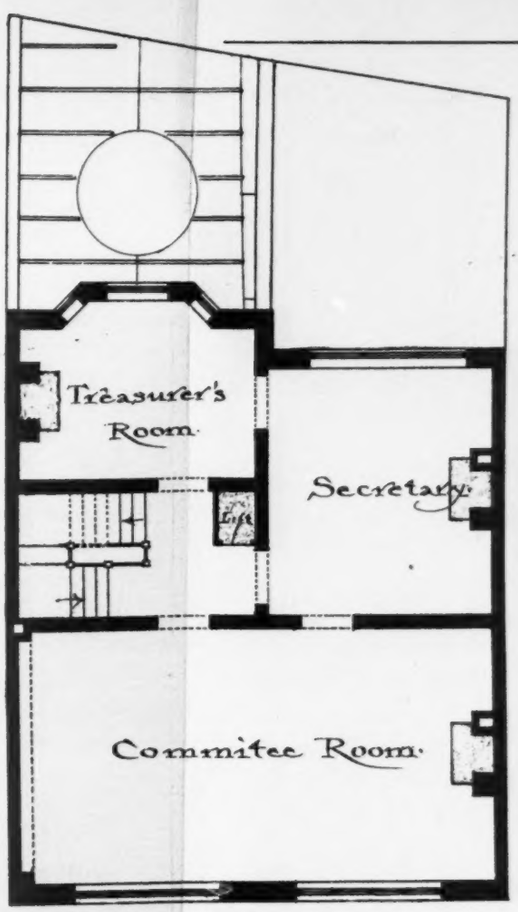
10 5 0 10 20 30 40 Feet

PHOTO-LITHO. SYRACUSE & CO. 44 & 45 EAST HARDING STREET, FETTER LANE, E.C.

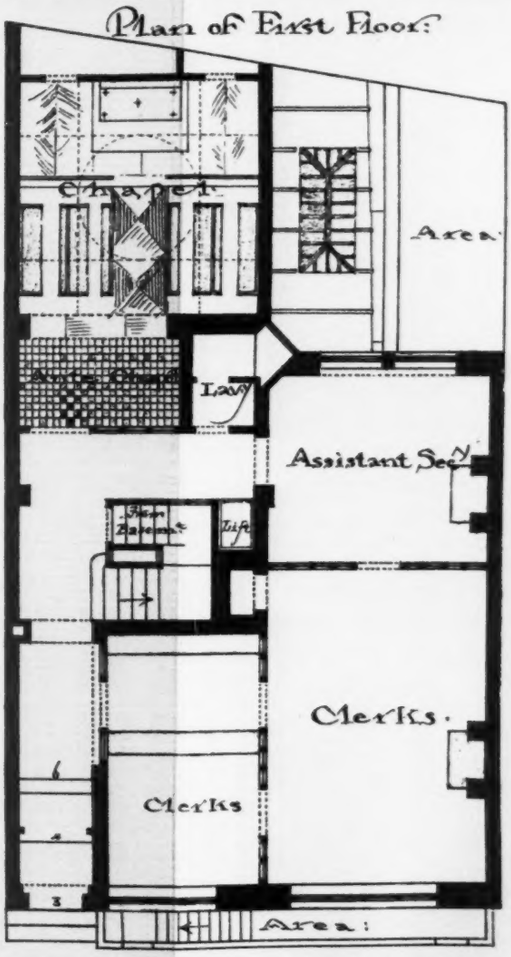
UNIVERSITIES' MISSION TO CENTRAL AFRICA:
Design for New Premises: Dartmouth Street: Westminster:
Gerald C. Horsley: Architect:



Plan of First Floor.



Plan of Ground Floor.



SCALE

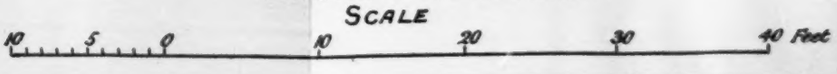
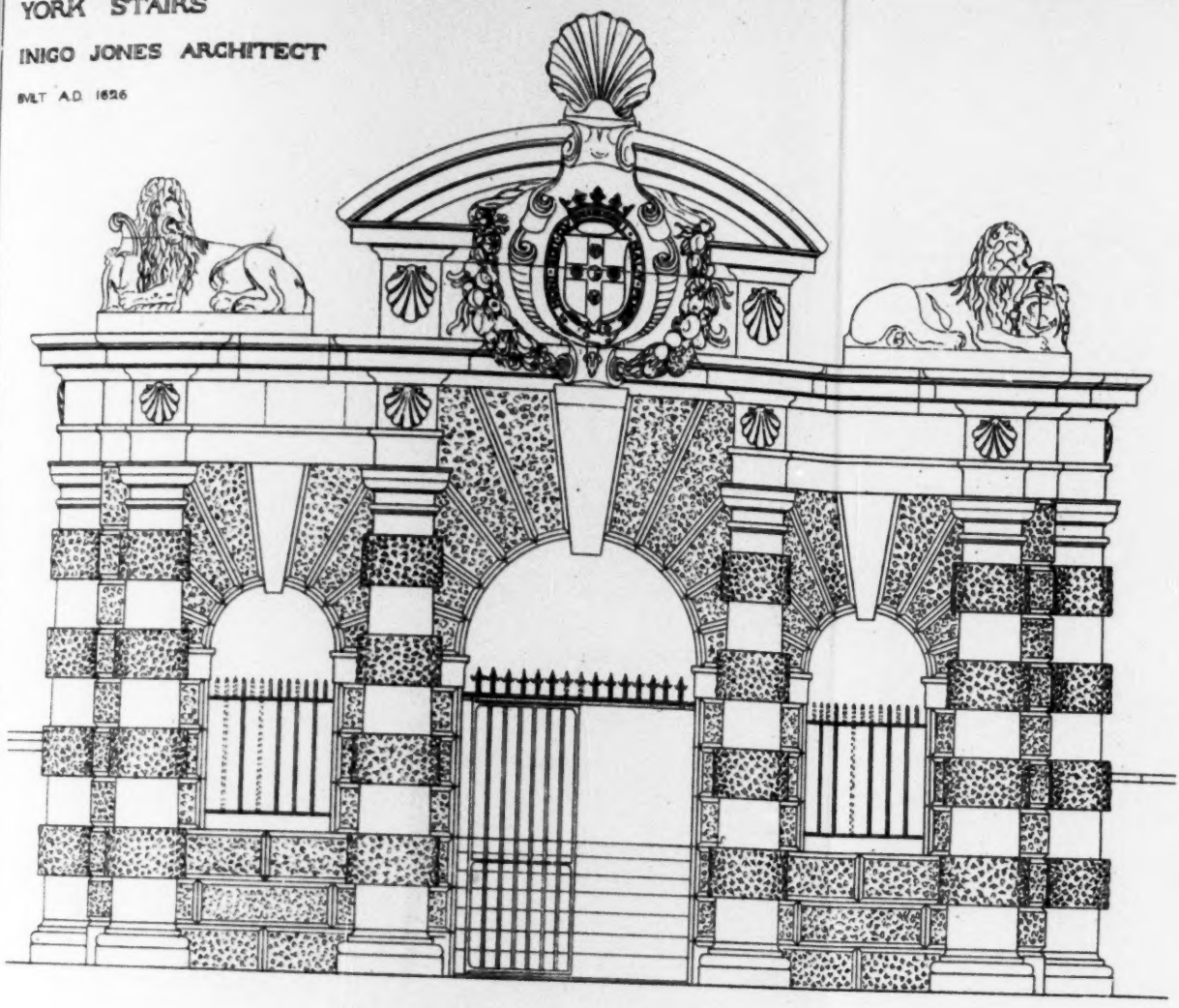


PHOTO-LITHO. SPRAGUE & Co. 4 & 5 EAST HARDING STREET FETTER LANE E.C.

YORK STAIRS

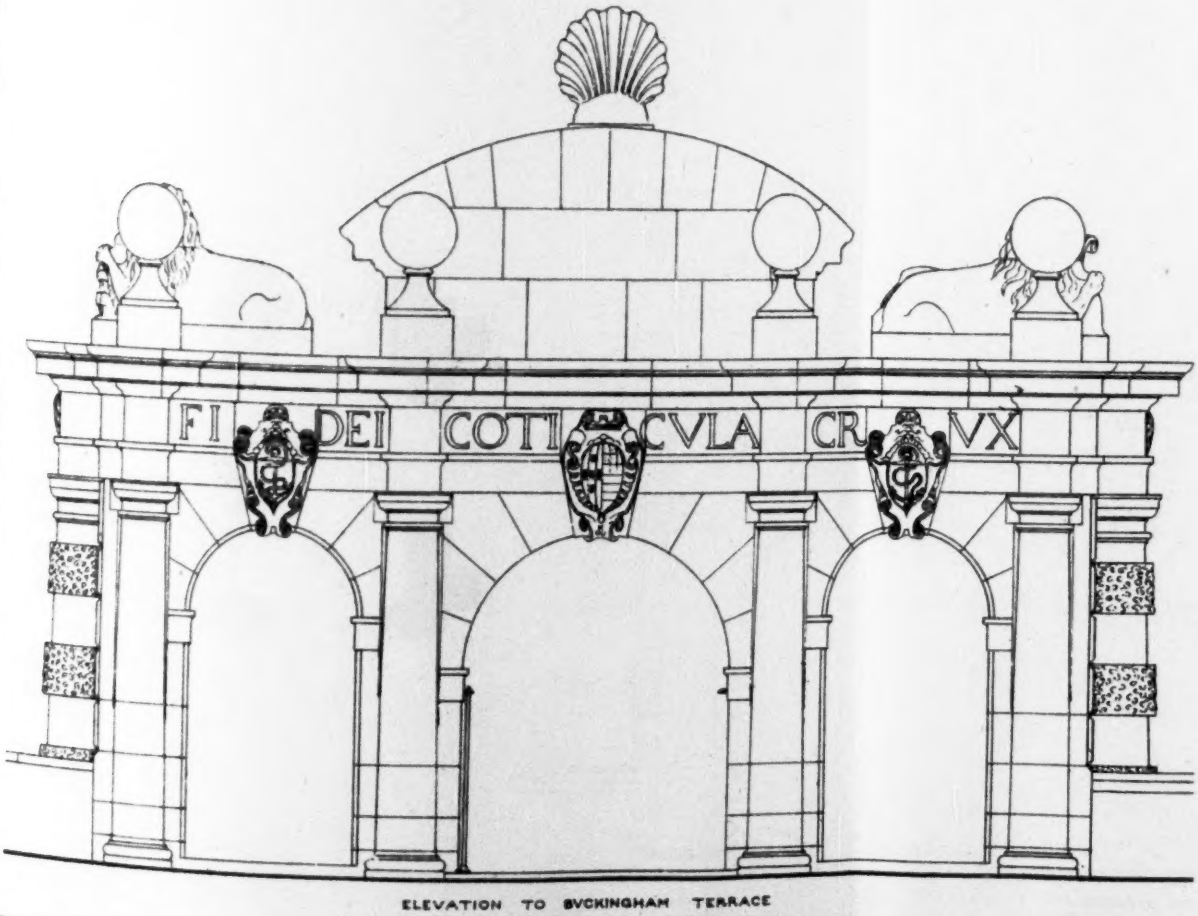
INIGO JONES ARCHITECT

BVLT A.D. 1626

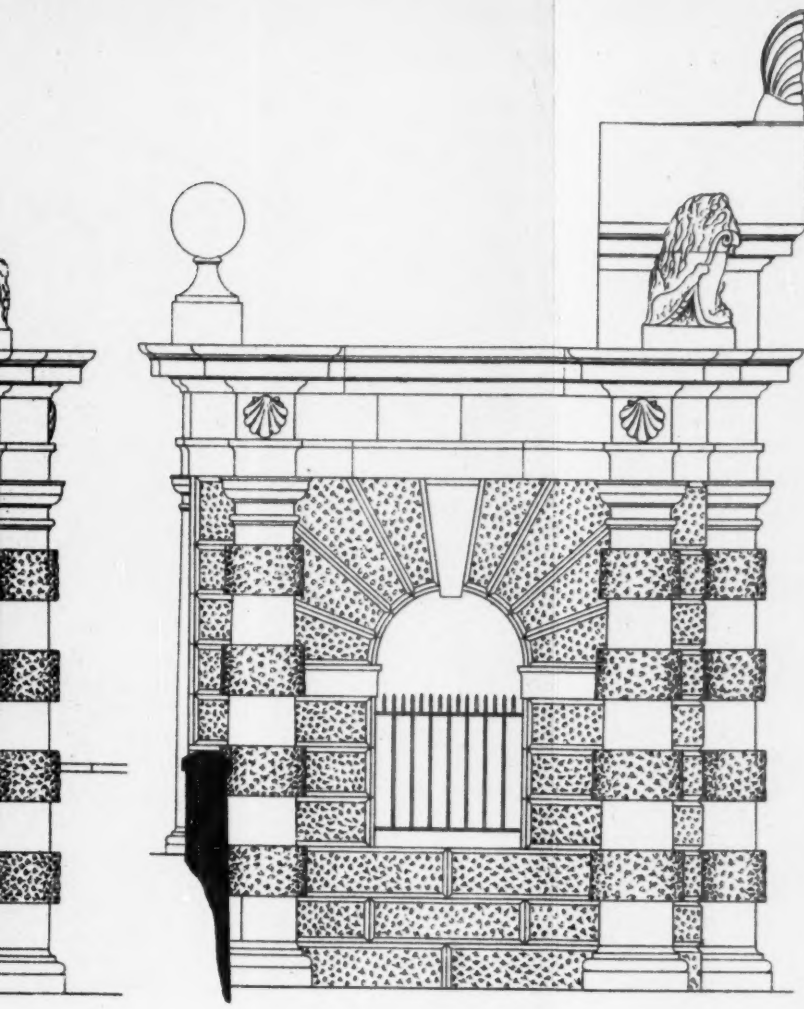


ELEVATION TO RIVER

SCALE OF FEET

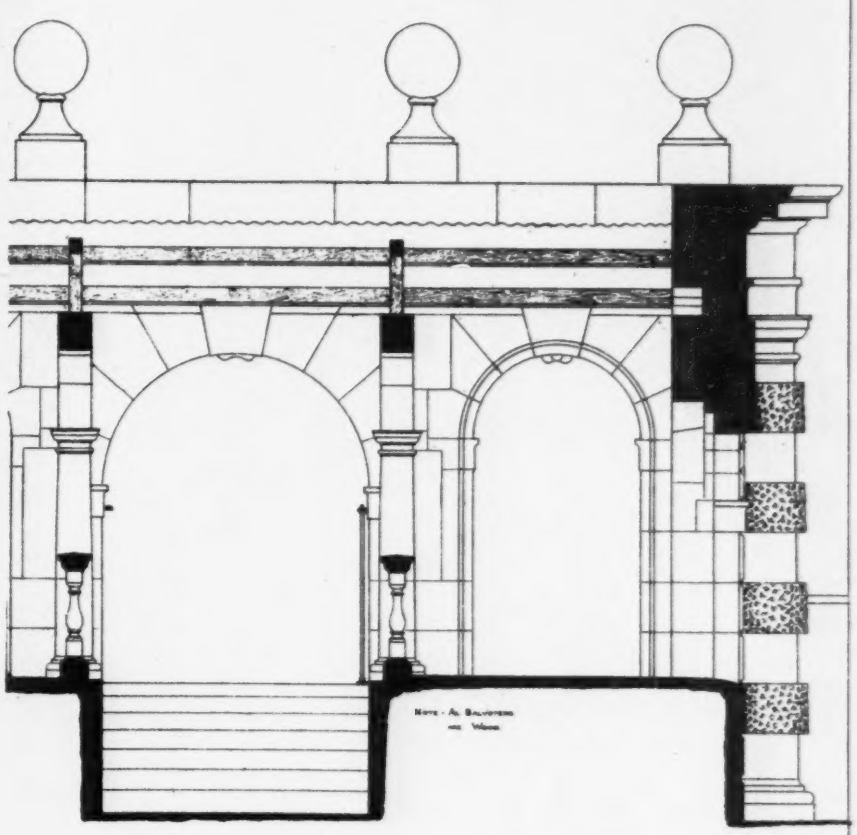


ELEVATION TO BVCKINGHAM TERRACE

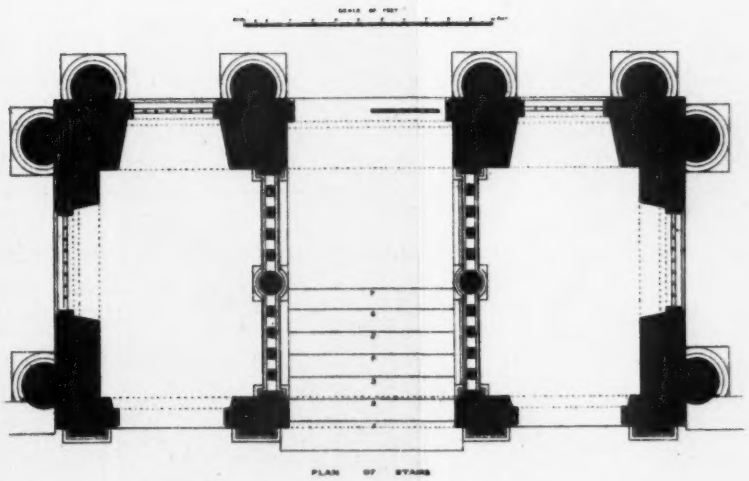


SOUTH WEST ELEVATION

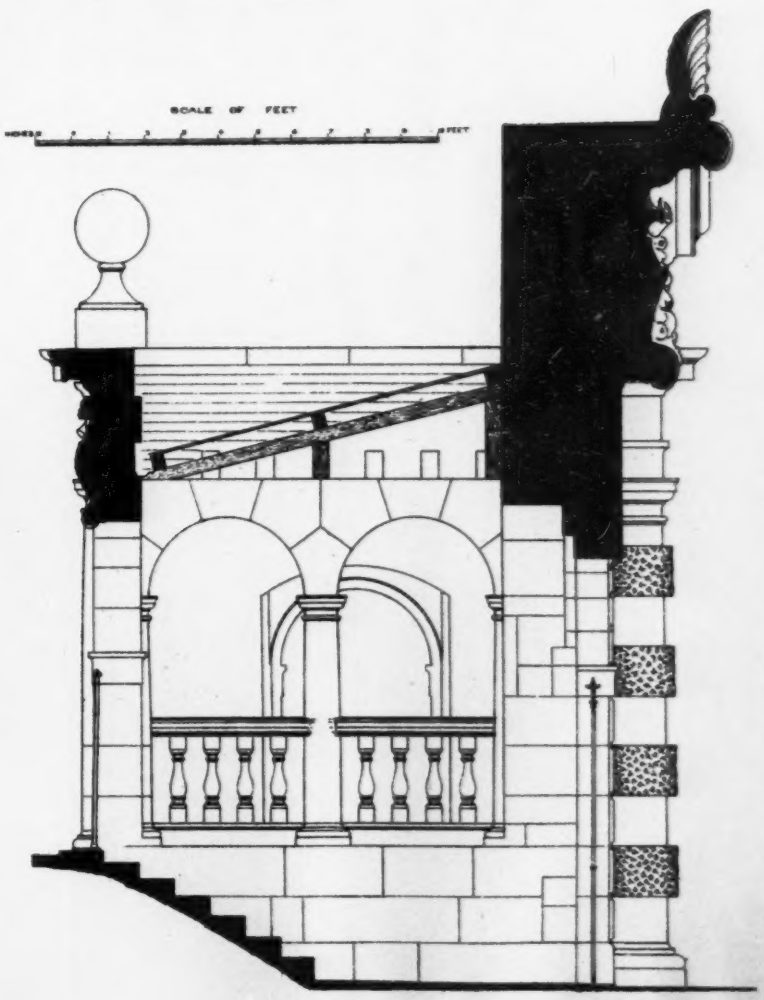
SCALE OF FEET



LONGITUDINAL SECTION



PLAN OF STAIRS



SCALE OF FEET

TRANSVERSE SECTION

PHOTO-LITHO. SPRAGUE & Co 4 & 5 EAST HARDING STREET, FETTER LANE, E.C.

GATE.—MEASURED AND DRAWN BY MR. W. R. MOSLEY.

given at
the Qua
interesti
Mr. J.
course
said tha
develop
well wit
eventua
work of
recently
inconve
could
regarde
almost
much m
they ha
reliable
industr
industr
ligent
than th
their C
listenin
but fo
duratio
would
On
Associ
was de
Llanbe
Smith,
works
and w
the pro
membe
On
slate
the ch
being
witnes
rock
ground
They
so as
quarry
Bethes
Ogwe
purpo

RES
Sir
the fo
"res
limit
In
1857
discov
beyo
and
block
Digi
a mi
othe
Afte
follo
piece
bod
dou
qua
and
Pre
whi
boo
hur
car
evi
T
full
rep
say
pa
be
me
un
pr
en
qu
wi
di
to
(
de
no
qu
sh
au
th
N
fo
w
st
b
o

given at the Town Hall, in honour of the visit, by the Quarry Proprietors' Association, when some interesting remarks on the slate industry were made. Mr. J. E. Greaves occupied the chair, and in the course of a long speech observed that it had been said that it took fully fifteen years to open and develope a slate quarry. He believed that that was well within the mark. Of course, the supply would eventually overtake the demand, but it would be a work of time. The sudden demand, such as they recently witnessed, though it might cause some inconvenience, was one of the best guarantees they could have for the stability of their trade. He regarded the quantity of marketable slates to be almost as stable as that of gold, and certainly much more than that of silver. Another guarantee they had for the stability of their trade was the reliable character of the labour employed in the industry. There was not a more reliable, more industrious, more hard-working, and more intelligent body of workmen in the United Kingdom than the quarrymen of North Wales. It was true their Celtic nature might send them astray by listening to interested and irresponsible agitators, but fortunately these spasms were but of short duration and would soon pass away and reason would obtain.

On Wednesday morning the members of the Association drove to Llanberis; whilst the Thursday was devoted to a visit to the Dinorwic Quarries at Llanberis, the property of Mr. G. W. Duff Assheton Smith. The visitors were taken over the extensive works by the Hon. W. W. Vivian, the chief agent, and witnessed the principal objects of interest and the process of blasting the rock. Subsequently the members proceeded to Bangor.

On Friday a visit was paid to Lord Penrhyn's slate quarries at Bethesda, under the guidance of the chief agent, Mr. E. A. Young, the slate mills being inspected *en route*. At the quarries they witnessed blasting operations and the firing of rock cannon, and afterwards went to the underground shaft and inspected the pumping machinery. They were then taken up in the water balances so as to afford a bird's eye view of the whole quarry. Shortly after noon the company left Bethesda in brakes and drove down the beautiful Ogwen Valley and through Penrhyn Park, for the purpose of visiting Penrhyn Castle.

Correspondence.

To the Editor of THE BUILDER.

RESTORATION OF THE MAUSOLEUM.

SIR,—"The Meta" in Mr. Stevenson's design is the feature which has apparently governed the whole "restoration," and to that feature alone I would limit this note.

In Sir C. Newton's report from Budrum, May 11, 1857, he tells how he had "made some remarkable discoveries on the north side of the Mausoleum. Beyond the apparent boundary of the foundations and parallel to it I discovered a wall of white marble blocks, beautifully jointed in isodomous masonry. Digging beyond this wall to the north I discovered a mass of large marble slabs lying piled one over the other in the earth, and intermixed with statues. After removing these slabs carefully we extracted the following sculptures. 1. A colossal horse in two pieces, one of which extends from the middle of the body to the tail, 6 ft. 4 in. . . . I have therefore no doubt that this is one of the four horses from the quadriga which stood on the top of the pyramid, and which we know from Pliny was executed by Pythis. It appears to me that the marble wall which we have just discovered is the northern boundary of the temenos, and that the pyramid was hurled by an earthquake against and over this wall carrying with it the quadriga. . . . They have evidently never been disturbed since they fell."

The blocks, marble slabs, or steps referred to are fully described and illustrated in Lieut. Smith's report from Budrum, June 1, 1857, in which he says:—"Nothing else which could be identified as part of the pyramid has been found. . . . . These blocks have an uniform depth of 11⅛ in. . . . . The measurement of all the steps that have been found is uniformly either 1 ft. 9 in. or 1 ft. 5 in." And he proceeds to show how the pyramid was constructed entirely of such steps.

The bearing of these extracts is obvious. The quadriga, and the upper portion of the pyramid on which it stood, were huddled together to some distance, and their remains were found heaped together just as they had fallen. Sir C. Newton ("Travels and Discoveries," vol. ii., p. 121) gives detailed evidence to show that these marbles had not been disturbed from the time they fell. It is quite certain that if there had been a pedestal and "meta," such as Mr. Stevenson's design shows, we should have found portions at least of the pedestal and meta steps along with the quadriga, and not these slips which he shows at the foot of the "meta." Not only were no traces of such "meta" steps found there, but I am not aware of any steps that were found 23 in. thick, or anything that would suggest a pedestal, amongst the remains sent over by Sir C. Newton. A few stones were found indicating a less tread than the pyramid slabs. They are specified in Newton's "Guide to the Mausoleum Room, 1886," Nos. 17-23, and may be seen at the museum, but are all less than 12½ in. thick, and were probably plinths from the base of the podium, &c.

Again, there is now built up in its place at the Museum a marble beam which lay between the architrave of the order and the wall of the cella. Newton describes it and says, "this end must have been inserted in the cella wall," and clearly Newton was right and there was a cella.

Surely too much has been made of Martial's poetical phrase. He probably never saw the mausoleum, the pyramids of Egypt, the walls of Babylon, or the other wonders he decribes as inferior to the Colosseum built by his patrons Titus and Domitian.

THOMAS ARNOLD.

P.S.—An engraving of Sir C. Wren's restoration was published, and a copy of it is hung up in the Mausoleum room. I should like to see it reprinted. A clever restoration, made before Newton's discoveries, by Garbett, is given in his book on "Design in Architecture."

THE PRIORY OF ST. JOHN THE BAPTIST, HALIWELL.

SIR,—I hope the reference in the last issue of the *Builder* (see page 207 *ante*) to this establishment of Black Nuns of the Order of St. Benedict will elicit from antiquarians some further information as to the buildings, of which remains existed when Maitland wrote his history of London. He considers it to have been founded between 1108 and 1127 A.D., so that unless rebuilt in the interim, it must have been one of the oldest Norman structures in the county at the time of its re-edification by Sir Thomas Lovel, K.G., *temp.* Henry VII., or early in that of Henry VIII. Sir Thomas added a chapel in the then prevailing style, and was interred therein, and upon most of the windows was the legend, "All the nunnes in Holywell, pray for the soul of Sir Thomas Lovel."

The map of London in 1563 A.D. in Pennant's London seems to show the buildings as far north as Shoreditch Church, but there is nothing to identify the Priory from others. Some of your readers may know whether John Carter sketched the ruins, as it is said he did those of the more important Priory of Holy Trinity, the ruins of the south transept whereof he pronounces Saxon—according to the then current notion. Maitland says the ruins of Haliwell were erroneously called "King John's Palace," which probably gave the name to the court leading from New Inn-yard, which is crossed by the N.L. Railway.

I am not aware of any traces of the ruins among the wretched modern buildings abutting upon these thoroughfares. The line of the middle level intercepting sewer under construction by the Metropolitan Board of Works in 1864 passed through New Inn-yard on its way to Bethnal Green, and one of the shafts of the tunnel was there sunk in a back yard, and some rough rubble walling was found beneath the surface. On being cleared, it proved to be two side walls of a vault, the earth floor of which was 8 or 10 ft. down, and two leaden coffins lay side by side, which were tapering in outline and square shouldered, with rounded termination to receive the head. The skeletons were fairly perfect, and I do not remember any traces of wood enclosing the lead. I believe an idea was entertained that it was Sir Thomas Lovel's sepulchre, but, from the make of the coffins and the roughness of the walling, which I think was of chalk, they were probably of several hundred years earlier date. I do not know what became of them, but it is likely some further inquiry was instituted, of which I did not hear any report. The walling was destroyed in further sinking the shaft.

I have not had opportunity of referring to the Rev. T. Hugo's work, published 1857, and I do not think Mr. Walford's interesting compilation adds any information about the Priory to what is given by Maitland and Pennant.

If any spring from which the well was supplied remained, it would certainly have been tapped by the deep drainage of the district, and it would have probably been no deep sinking, but of the nature of the old Shepherds' Well at Belsize, Hampstead.

E. W. HUDSON, A.R.I.B.A.

"DESIGN FOR A COUNTRY HOUSE."

SIR,—I have noticed in the *Builder* of the 12th inst. a "Design for a Country House," which seems to me to be, on the whole, so admirably planned, that I cannot resist making one or two remarks on what appear to me to be slight defects in it.

Of architecture I know nothing, and I am regarding the design merely from a liveable point of view. Every summer for some years past I have lived in a *different* house of somewhat similar size to the one designed, besides having viewed dozens of others which were unsuitable, and so have obtained an idea of the convenience or reverse of certain arrangements; though, of course, what suits one may not suit the other.

1. I cannot find the business-room on the plan, though mentioned in the note.

2. The library (which should be the quietest room in the house) is placed between the dining-room and the domestic department, where the greatest traffic in the whole house occurs—laying and carrying away breakfast, luncheon, and dinner. There is thus almost a constant movement and rattle past the library door all day long. It also communicates by a door with the dining-room, which would increase the disquiet. By this arrangement the dining-room is farther removed from the kitchen than there is any necessity for, an important point for those who like their food hot! The service to the dining-room should not pass the doors of any principal apartments.

3. There is no serving-room attached to the dining-room, a very important item in a house of this description, and the dining-room has four doors.

4. The larders are too far from the kitchen. This is of no importance in the case of raw meat, game, &c., but the cooked meat larder should be adjoining the kitchen. Cooks are human and unless the larders are handy food is left on kitchen-tables and dressers longer than it should be, and they do not like running backwards and forwards for every little thing they require. True, there is a pastry larder, but with a west aspect, probably the worst it could have. The larders are also in proximity to the water-closets, which is most undesirable. An east aspect would surely have been better for kitchen, &c.

5. The scullery door opens into the passage. Refuse, &c., has to be carried into the passage, and almost past the entrances to the larders; this is unsatisfactory. If possible the scullery should have a door opening direct to the yard, where would also be the grease trap, or whatever the drainage arrangements may be, outside the building, and easily accessible.

6. A kitchen-garden placed where proposed would be an intolerable nuisance. The fact of having constantly to dig in dung and water with manure-water are sufficient reasons without seeking farther.

7. In the design there appears to be a building to the north not marked on the ground plan. Should this be intended for stables it is too near the house. Stables should be well removed from the house, or the grooms are hanging about the back yard, which should be avoided. While apologising for writing to you on a matter which does not concern me at all, let me take this opportunity of thanking you for much interesting information which I have from time to time obtained from the *Builder*.

ERNEST A. SANDEMAN.

P.S.—The door of the safe is in the butler's bedroom, and not in the pantry, so that all plate has to be carried in and out of the butler's *bedroom*, which is not at all a nice arrangement.

SIR,—I am very much obliged to you for your consideration in allowing me to see an "advance copy" of the letter you have received on the subject of the plan of a country house, my design for which you illustrated in your issue of the 12th inst.

I need hardly say that I feel flattered by the remark with which your correspondent begins his letter, namely, that the house seemed to him so admirably planned that he was moved to comment on the defects which appear in it; and I have much pleasure in either attempting to meet his objections, or in admitting my faults, faults which I trust I shall be able to convince him, until in actually carrying out the house, admit of easy remedy. I will answer him categorically.

1 and 2. On looking at the plan again, I am not surprised at his being unable to find the "business-room" mentioned in the description of the house. By a piece of stupidity on my own part, I find that the room I intended for the business-room has been marked *library*. On referring to my first plan, I find the room in question properly described as a *business-room*, and I cannot imagine how I came to change the name in making a fair copy. The real library is on the first floor, over the dining-room. It will thus be seen that my business-room corresponds with the printed description of it, and this does away with the objection that the library is in the noisiest part of the house.

As regards the distance of the kitchen from the dining-room, I am by no means prepared to admit that it is too far away. In small houses, the kitchen is generally placed as close to the dining-room as possible, chiefly, I think, for convenience in serving when the staff of domestics is small; but in a case like the present, where the servants would be numerous, I think it is an advantage to keep the room where cooking is done rather removed from the principal rooms of the house than otherwise. As far as my memory and knowledge of the plan of the offices serve me, in none of the houses of this size with which I am acquainted have I known the kitchen placed much nearer to the dining-room than here shown: nor have I been thereby compelled to eat cold dinners. Neither does an examination of recently published plans of country houses by modern architects of repute lead me to think I have made my kitchen unduly distant. And I think that your correspondent will admit that in the various houses he speaks of having occupied his experience has been similar to mine.

3. As regards the want of a serving-room, I fancy that the ample space at the end of the service-corridor, outside the *business-room* (marked *library*

on plan as explained above), admitting of a serving-table being placed in it, would go far to supply this want, and prevent crowding or confusion outside the service-door of the dining-room. Yes, the dining-room *has* four doors, and I am afraid that without recasting the plan they cannot be avoided, unless the door to the *business-room* (library) from the dining-room is considered superfluous, and the door to the morning-room done away with as well.

4. The lack of a cooked-meat larder next the kitchen I admit as a defect; luckily, one could be got in without dislocating the plan. The room marked "pastry," by the way, is not a pastry-*larder*, but a *pastry-making* room; and, in spite of its western aspect, there should be no difficulty in keeping it sufficiently cool. The kitchen, I must point out, should, strictly speaking, have a *north*, not an *east*, aspect, as your correspondent suggests. As, however, it receives its chief light from a skylight, the objection to its west aspect is diminished. The same applies to the scullery, the windows in the wall being inserted chiefly to avoid the depressing influences of an entirely top-lighted room. As regards the position of the larders in relation to the water-closets, the undesirability of this arrangement has already been pointed out to me in the *Builder* a few months ago, in one of the articles dealing with the Royal Academy Exhibition. That their relative positions are undesirable, I can only admit to be too true; but the difficulty could in the present instance be in a large measure overcome by making the cellar-steps (shown against the end wall) come between the larder and water-closets.

5. Here I cannot agree that in the practical working of the house the position of the scullery would be found especially objectionable. Of course, it might even now be arranged to open on to a yard; but I must say that it seems to me undesirable to multiply entrances to the servants' part of the house. But in any case I need hardly say that all drainage, whether of scullery-sinks, or what not, would be entirely arranged outside the house.

6. I cannot but own that the position of the kitchen garden is open to the objections your correspondent points out. Would he admit an orchard there instead?

7. The building shown to the north is not the stables, but a laundry. The words "to stables" with an arrow pointing along the road, printed in the roadway at the W. end of the plan, show that the stables are farther off. As regards the safe in the postscript, since the security of the plate is, after all, more dependent on the honesty of the butler than on the position of the safe door, it might just as well be accessible from the pantry as from his bedroom.

With this I have, I think, answered in some sort each of your correspondent's objections. If I had been able to point my remarks or palliate my faults by reference to some "modern instances," I might have been able to defend myself better, though at the risk of offending the owners and architects of the houses cited.

I wish, indeed, that it were possible to devise a plan that comprised in itself every excellence; but if such could be produced, the possibilities of variety—without inferiority—in house-planning would be sadly diminished, and my present design would not be the one your correspondent was so good as to praise, but something different.

I can only say to him, in the words of Horace,

> "In . . . . vitiis tam cernis acutum
> Quam aut aquila aut serpens Epidaurius."

Thanks to his keen but kindly criticisms, I am now in a position to alter my plans for the better—an opportunity which, had I confined myself to a block plan, or even given no plan at all, he would not have been able to afford me.

AMBROSE M. POYNTER.

The Student's Column.

RURAL DRAINAGE.—XII.

IN order to secure the necessary gradients for themselves or to provide a sufficient fall for the house drain *en route*, sewers have frequently to be laid at a considerable depth below the surface of the ground. This becomes a very serious consideratiion when the excavation has to be made in rock or quicksand. It is always advisable before deciding upon the lines of sewers to make trial holes to the full depths to which it is proposed to excavate the trenches, as a deviation through more easily worked ground may often be possible, and a heavy outlay avoided.

Exposed vertical faces of earth, *e.g.*, the sides of trenches, tend to "slip" until they form slopes having a certain definite inclination to the horizon dependent upon the material, and the angle which the slope makes with the horizon is called the "angle of repose." The tangent of the angle of repose is termed the "co-efficient of friction," and corresponds to the vertical height of the slope divided by its base (fig. 21).

$\frac{h}{l}$ = tangent of angle of repose = co-efficient of friction.

Fig. 21.

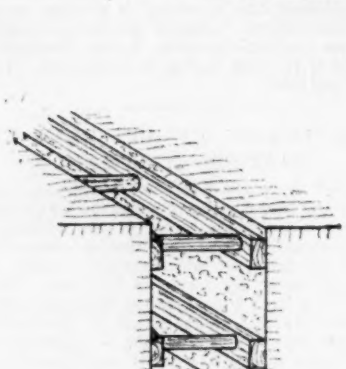


Fig. 22

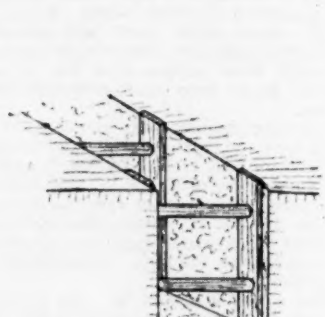


Fig. 23.

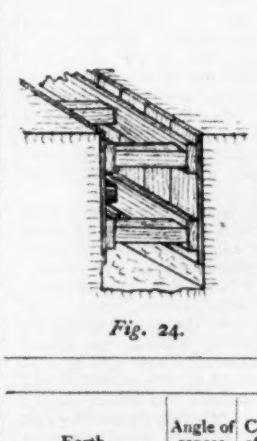


Fig. 24.

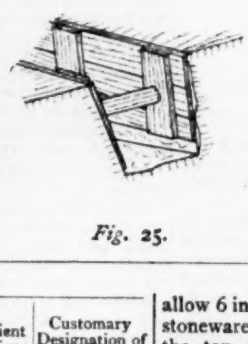


Fig. 25.

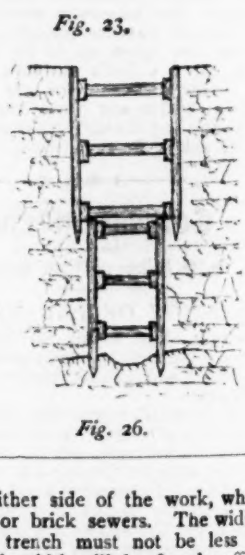


Fig. 26.

Earth.		Angle of repose. ϕ	Co-efficient of Friction. f	Customary Designation of natural slope. 1÷f to 1.
Dry sand, clay, and mixed earth.	from	37°	0.75	1.33 to 1
	to	21°	0.38	2.63 to 1
Damp Clay		45°	1.00	1 to 1
Wet Clay	from	17°	0.31	3.23 to 1
	to	14°	0.25	4 to 1
Shingle and Gravel	from	48°	1.11	0.9 to 1
	to	35°	0.70	1.43 to 1
Peat	from	45°	1.0	1 to 1
	to	14°	0.25	4 to 1

Although all exposed vertical faces of earth tend to arrive at their appropriate natural slopes, the adhesion of the particles to each other gives the earth a temporary stability. "The temporary additional stability, however, which is produced by adhesion, is useful in the execution of earth-work, by enabling the side of a cutting to stand for a time with a vertical face for a certain depth below its upper edge. That depth is greater the greater the adhesion of the earth as compared with its heaviness; it is increased by a moderate degree of moisture, but diminished by excessive wetness."

The following are some of its values:—

Earth.	Greatest depth of temporary vertical face.
Clean dry sand and gravel	0 ft.
Moist sand, and ordinary surface mould	from 3 to 6 ,,
Clay (ordinary)	,, 10 to 16 ,,

—"Rankine," p. 315).

As a general rule rock and chalk will stand vertically, and an allowance on each side of 3 in. for each foot in depth for ordinary earth or clay will be sufficient.

The width at the bottom of the trench should allow 6 in. on either side of the work, whether stoneware pipes or brick sewers. The width at the top of the trench must not be less than 2 ft. 6 in., but this width will be found sufficient for working in even when the depth is considerable.

Cost of excavation for sewers, including filling in, carting away surplus earth, punning, &c.:—If x = current day wages.

Material.		Day's Work of labourer in cub. yds.	Cost per Cubic Yard.
Not exceeding 14 ft. in depth.	Rock	1·03	$x \div 1·03$
	Hard sand.....	2·07	$x \div 2·07$
	Clay, earth, or rubbish	1·70	$x \div 1·70$

For excavation beyond 14 ft. in depth the following quantities must be added to the above results:—

				Cost per cubic yard.
Rock.				
For 1st foot	beyond	14 feet	...	$x \div 2.6$
,, 2nd	,,	,,	...	,, 2.2
,, 3rd	,,	,,	...	,, 1.9
,, 4th	,,	,,	...	,, 1·8
Sand.				
For 1st	,,	,,	...	,, 7·7
,, 2nd	,,	,,	...	,, 6·0
,, 3rd	,,	,,	...	,, 4·5
,, 4th	,,	,,	...	,, 3·6
Clay.				
For 1st	,,	,,	...	,, 6·0
,, 2nd	,,	,,	...	,, 4·5
,, 3rd	,,	,,	...	,, 3·6
,, 4th	,,	,,	...	,, 3·0

Trenches excavated in bad ground, and in all cases except where they are very shallow, should be protected by shoring.

The form taken by the shoring must depend upon the character of the ground, the simplest description consisting of rough planks placed

horizontally ("walings") or vertically ("poling boards") against the sides of the trench and kept apart by pieces of timber placed across ("struts") (figs. 22, 23).

The distance apart of the "poling boards" or "walings" depends upon the nature of the ground, and when the ground is bad, *e.g.*, in running sand, the "poling boards" are made continuous, and are placed behind the "walings," as in fig. 24, or "sheeting" is placed behind the "poling boards," as in fig. 25. The latter method has the advantage of permitting the sides to be supported continuously as the trench becomes deeper. In excavating in quick-sand, stable-litter, ashes, or other suitable material should be placed behind and between the "poling-boards" or "sheeting."

In very bad cases "runners" or "sheet piles," which are pointed and shod with iron, are driven at the back of the walings. If the trench is very deep, a double or treble row of runners must be employed, the width of the trench at the surface of the ground being made sufficient so as to allow each successive row to be driven within the line of the row next above it (fig. 26).

In all cases where there is any doubt as to the future stability of the ground it is advisable to leave the timbers of the trench so as to intercept any strains during the process of consolidation of the ground, which might damage the works. This is especially important where any movement in the ground might disturb houses or buildings in the vicinity of the trench.

When deep trenches are constructed in narrow streets, it is well to shore the houses on either side, and the shoring should not be removed until the trenches are thoroughly consolidated, and the removal must be performed with great caution.

As it is a fundamental requirement of a properly constructed sewer that it should be laid and subsequently maintained at a true gradient, it is absolutely necessary that the foundation must be sound. As a rule, in ordinary soil, and with sewers of small diameter, no difficulty is presented in this respect. Where, however, the floor of the trench is in shifting sand or boggy ground, an artificial foundation for the sewer must be provided. The usual method is to carry the excavation below the formation level of the sewer, and to fill in with ballast, clinker, rubble walling, or concrete as the exigencies of the case may require. If concrete is used, a bed of closely wattled hurdles or planking is generally necessary. Foundations of hurdles or planking without concrete may be employed, but in the case of pipe-sewers a bed of well consolidated earth must be provided, so as to allow chases to be formed for the sockets.

GENERAL BUILDING NEWS.

NEW HOTEL, PORT ERROLL.—The Great North of Scotland Railway Company are to erect at Port Erroll a hotel, about half a mile from the new Cruden branch railway just constructed by them from the borough of Ellon to the fishing village of Boddam, near the town of Peterhead, Aberdeenshire. The designs are by Mr. John J. Smith, Aberdeen, the company's architect. The building will be a five-story one, and the south elevation measures 118 ft. The walls will be of Peterhead granite, with dressings in Kemnay granite. The building is in the Scottish baronial style, and one of the architectural features is a square tower, 80 ft. high above ground floor level, with crenellated front and turrets at angles. At the south-west angle of the west elevation is a turret, 12 ft. diameter, and 48 ft. high. The contractors for the work are:—Mason, Mr. E. Gauld; carpenter, Messrs. James Garvie & Sons; slater, Mr. Geo. Farquhar; plumbers, Messrs. J. Blaikie & Sons; plasterers, Messrs. Roger & Baxter; painters, Messrs. James Garvie & Sons; ironwork, Messrs. W. M'Kinnon & Co.

RESTORATION OF CLONFERT CATHEDRAL, CO. GALWAY.—We learn that an effort is being made to obtain the restoration of Clonfert Cathedral, county Galway, founded by St. Brendan in the year 558. It has a very chequered history. It suffered greatly from the incursions of the Danes, who frequently sailed up the River Shannon from Limerick and attacked Clonfert. It was burned six times between the years 774–1179; and was plundered three times between the years 949–1065. In the year 1541 it was almost totally destroyed. Bishop Woolley repaired the Cathedral in the year 1664. Since that time up to the present, a period of over 230 years, some alterations and improvements have been effected, but no general work of restoration has been carried out, and the building is now in great need of it. It is one of the smallest cathedrals in the kingdom, and is used as the parish church. The architect estimates the cost of restoration at 1,500*l.*

PROPOSED INFIRMARY, NEWCASTLE-ON-TYNE.—At a meeting of the House Committee of the Royal Infirmary, Newcastle, on the 10th inst., a lengthy discussion took place with regard to the site for a new infirmary, and it was agreed that the necessary steps should at once be taken to have the Committee's proposals placed before the City Council, in order that if a decision in favour of the scheme proposed should be come to, the Governors may be enabled to lodge plans so that they can be considered early next year.

SCHOOL BUILDINGS, SOUTH NORMANTON.—The memorial stones of a Sunday school for St. Michael's parish church, South Normanton, were laid on Wednesday, the 9th inst. The structure is estimated to cost 900*l.* The contractors are Mr. G. Page, brickwork; Mr. G. Smedley, woodwork; and the architect is Mr. W. Dodsley, of Mansfield.

ROMAN CATHOLIC SCHOOL, COLCHESTER.—The new Roman Catholic School at Colchester was formally opened by Cardinal Vaughan on the 12th inst. The building stands in a central position in Priory-street, near St. James's (Catholic) Church. It is of red brick, with felted and slated roofs; there are two main entrances, with cloakrooms and offices; and, in addition to the principal school-room, which is 68 ft. in length by 21 ft. 6 in. in breadth, two large classrooms have been provided, one of them fitted with galleries for the use of infants. The ceilings are match-boarded, the floors of wood blocks laid on concrete, and special care has been bestowed upon the sanitary arrangements. The cost of the actual building was about 750*l.*; that of fencing, making up the playground, outbuildings, and drainage, about 200*l.* in addition, and accommodation is afforded for 240 children. Mr. Robert Beaumont, of Lexden, was the builder, and the architect was Mr. Chas. E. Butcher, of Colchester.

HOSPITAL, LEITH, N.B.—On the 11th inst. the new Leith Public Health Hospital was formally opened. The hospital is situated on East Pilton estate, which lies to the north-west of Edinburgh. It is of brick, consisting of a gate-keeper's lodge, an administration block, an isolation ward block, four ward pavilions, a patients' discharging block, a blanket and clothes block, and a block which comprises a coachman's house, a stable, an ambulance room, and a mortuary. These buildings have been placed north and south, and are built upon six acres of ground; but an additional three acres have been acquired, lest in the future an extension might be necessary. The total cost is estimated at about 50,000*l.* Externally the buildings are very plain, but the interior of the various wards and apartments are handsomely finished and equipped. Portions of ground have been laid out for recreation purposes. The buildings are heated by steam and lighted by gas. The original plans for the hospital were designed by the late Mr. James Simpson, but the work was completed by his son, Mr. George Simpson, the present architect of the burgh.

THE RESTORATION OF CANTERBURY CATHEDRAL.—The restoration of Canterbury Cathedral is making satisfactory progress. The work in the crypt, which was commenced in the time of Dean Payne Smith, is now approaching completion. The bases of the columns, which have been covered with earth for centuries, have been uncovered, and by this means some of Ernulf's finest work is disclosed to view. With improved drainage, a concreted floor, and glazed windows all round, there will be no danger of the flooding which led to such a disfigurement in the past. The beautiful work of the Lady Chapel is left intact. The interior of the Chapter House is wholly occupied by scaffolding, it being hoped to have this part of the restoration completed in readiness for the great gathering of next year in connexion with the thirteenth-century commemoration of King Ethelbert's baptism. The stonework of the large windows at the west and the east ends was crumbling, and it was found necessary to put entirely new jambs and coping above, but the delicate tracery of the windows and the mullions are to be preserved. The work is almost completed at the west window, and the other will be commenced shortly. Two out of four other windows which were blocked up have been opened. The fund at present amounts to about 12,500*l.*

MISSION ROOM, WALSALL.—The memorial stone of a new mission room, dedicated to St. Chad, and to form part of the parochial building of St. Peter's parish, Walsall, was laid on the 10th inst. The site of the building is in Upper Green-lane, in the centre of a densely-populated neighbourhood. The front elevation will be of best red pressed bricks, with moulded bricks in the ornamental parts, and it will carry a large mullioned and transomed window; other windows of a like character appearing in the side elevations. The eastern window will have three narrow lights with crisp tracing heads. The cost, inclusive of the site and furniture, will be about £800. The builder is Mr. S. Wootton, of Bloxwich, and Messrs. Bailey & M'Connall, of Walsall, are the architects.

SCHOOL BUILDINGS, WINTERBORNE ABBAS, DORSET.—A school building at Winterborne Abbas was formally opened the other day. It is a brick building with a roof of red tiles, situated in the centre of the village. The interior consists of a well lighted principal schoolroom, 42 ft. by 18 ft., and a class-room adjoining. There are two entrances with spacious lobbies. The decoration and fittings of the interior are of a plain description. The plans were made by Mr. A. Griffiths, and the work was carried out by Mr. J. Atkins, a local builder.

THE MATER INFIRMORUM HOSPITAL, BELFAST.—These buildings, which, according to the *Belfast News-Letter*, are now approaching completion, occupy a fine open site, having a frontage of 230 ft. to the Crumlin-road, and altogether contain an area of slightly over one acre, and is composed of red boulder clay, with a gentle incline from north to south. The hospital is designed on the "pavilion" system, the object being, as far as possible, to obtain an isolation of the wards, and the principal portions may be said to consist of three distinct blocks facing the Crumlin-road, the centre one being the administration building, flanked by a pavilion block on each side, that on the east being for males, and the west one for females. The two upper floors of the centre block contain a large number of private wards, the hospital staff finding an ever-increasing demand for them. The pavilions are connected on the ground floor only with the administration block by a wide corridor running east and west the entire length of the frontage. Each pavilion will be three stories in height, and will contain two large wards on every floor, each of these wards being provided with two sanitary chambers in towers, which branch off diagonally at the ends, and separated from them by disconnecting corridors. The spaces formed outside the gable ends by the projections of these towers will be utilised as verandahs for the use of convalescents. Each of the large wards is also provided with a ward kitchen and a small private ward containing only one bed. Between these extreme pavilions and the administration block is placed a smaller pavilion, containing wards and day-rooms for convalescents. Each pavilion has its own staircase, and in its "well" is placed the hoist, large enough for the removal of patients too ill to sit or stand. The hospital is planned for 137 beds and eight cots for children, and for each bed is allowed slightly over 1,300 cubic ft. of ward space, 9 ft. of wall space, and 100 square feet of floor space, some of the wards containing slightly more. With the view of insuring good ventilation of the whole establishment, the ground floor is well elevated over the soil, and supported on arches to allow the air to be under as well as round and over the buildings. The administration block contains on the ground floor the reception-rooms, offices, and rooms of the resident medical officers. Behind the centre of this block, and separated from it by the main corridor, is the chapel for the use of the Roman Catholic inmates and patients. The chapel is flanked on either side by a corridor, branching at right angles from the main corridor, off which are placed one-story buildings, containing the observation wards and recovery wards for patients' immediate use after operation. One of these corridors also leads to the sacristy and the operation-rooms, whilst another leads to the students' room and the lecture theatre, and terminates in the disconnecting corridor between this portion and the kitchen range of buildings. The yard divides the kitchen buildings from the laundry range, which occupies the extreme north-west corner of the site, isolated from all other buildings, contains the receiving-rooms, wash-rooms, drying-rooms, disinfecting chambers, stores, and ironing-rooms, and boiler and engine houses; whilst on the west side of the yard is placed the stable, mortuary, and post-mortem room. The "out" department occupies the front portion of the ground floor of the west pavilion, and has a separate entrance, so that the out-patients can have no communication with the others. A large waiting-room and three consulting-rooms are provided for out-patients, off which are placed dressing-rooms. The buildings will be of red brickwork, with stone dressings, and will be heated by steam. The principal entrance is in the centre of the administration block, which will be somewhat more ornamental than the adjoining buildings, and will be surmounted by a statue of the Mater Infirmorum, from whom the hospital derives its name. The entire establishment will be lighted by electricity by Messrs. Coates & Son, and advantage will be taken of the current to drive the laundry machinery, to work the hoists, and to cook in the ward kitchens. The heating has been carried out by Messrs. Dawson & Co., of Stalybridge, and will be by low pressure hot water, circulating through radiators. A novel feature in the hospital is the introduction of a garden roof, thereby utilising every available space for the patients. These roofs cover the great pavilions, and are well protected and sheltered; they are being constructed by the Vulcanite Roofing Company, Donegall-street, Belfast, and will be tastefully laid out in grass-plots and flower-beds; one has been already finished. The floors of the wards and corridors will be of concrete covered with "terrazzo," which is a concrete of marble chippings brought to a smooth surface and polished. The windows will be supplied by the N. A. P. Window Company, Limited, of Westminster. The builders are Messrs. Henry Laverty & Sons; the quantities were prepared by Messrs. Slevin & Clayton, of Dublin; and the architect is Mr. W. J. Fennell, of Belfast.

RESTORATION, ST. NICHOLAS' CATHEDRAL, NEWCASTLE-ON-TYNE.—In the restoration of the tower and spire of this cathedral, which has just

been completed, it was found, on examining the old work, that the lantern windows had iron frames round them which were in a damaged and dilapidated condition, affecting the mullions and jambs, and when these iron frames were taken out it was discovered that nearly all the joints had been filled up by iron wedges driven into them. These had expanded with corrosion in such a manner as in some cases almost to pulverise the stones. In the restoration all the old wedges were taken out, new stones put in, and gun-metal frames substituted for iron. The most difficult piece of work of the whole restoration was the taking out of one of the arch stones in a flying buttress carrying the lantern. It is estimated that the whole work will cost about 2,000*l*. Messrs. Oliver & Leeson, of Newcastle, were the architects.

BAPTIST CHURCH, HEATON-ROAD, NEWCASTLE-ON-TYNE.—The foundation stones of this church were laid on the 10th inst. The edifice is to be of red brick, with stone facings and mouldings, and in the early Gothic style. It is intended to seat 750 persons, and the total cost, including heating apparatus, glazier's work, furnishing, &c., is estimated at 4,000*l*. The builder is Mr. W. A. Laws, of Heaton, and the architect Mr. W. H. Dunn, of Gateshead.

WESLEYAN CHAPEL, BURY. — The recently erected Wesleyan chapel and schools at Pits o' th' Moor, Bury, were opened on the 9th inst. There is accommodation for 700 persons in the chapel, while there are six class-rooms, a guild-room, two lecture-rooms and a minister's and choir vestries. The building has been erected at a cost of about 3,500*l*., from the designs of Messrs. Green & Brockbank, architects, of Liverpool.

TECHNICAL SCHOOL, SOUTH WIMBLEDON.—The new technical school, erected under the auspices of the Surrey County Council, in Hubert-road, South Wimbledon, is to be publicly opened on Wednesday, the 30th inst. The structure is of red brick, and was built by Mr. J. Burges, of Norman-road, from the designs of Mr. T. H. Micklethwaite, of Dean's-yard, Westminster, at a total cost of 2,500*l*. It is 100 ft. in length and 26 ft. in breadth, and consists of two floors containing in all six rooms, together with lavatories and the usual offices. On the ground floor are five rooms. The largest will be set apart for recreative purposes. Three others will be used for the classes, and the fifth is to be fitted up as a laundry. On the floor above, which can be approached by a fire-proof staircase at either end, is a spacious room which will be devoted to the teaching of cooking and dress-cutting, and will also be available for concerts and other entertainments, to meet the requirements of which a stage and dressing-rooms have been provided.

PUBLIC BUILDINGS, LIVERPOOL.—At a meeting of the Finance Committee of the Liverpool Corporation, held on the 15th inst., a letter was read from the assistant secretary of the Local Government Board, enclosing the Board's formal sanction to the borrowing of 17,500*l*. for the purpose of carrying out certain alterations, improvements, and decorations at the Town Hall, St. George's Hall, and the Municipal offices. The committee adopted a recommendation that that sum be placed at the disposal of this committee for the purpose specified.

REOPENING OF ST. STEPHEN'S CHURCH, NEWTOWN ROW, BIRMINGHAM.—This church was reopened on the 12th inst., after having been closed for renovation. For some considerable time the red sandstone, of which the fabric is composed, has been in a decaying state, and various repairs of a minor nature have been carried out. It was, however, at length found necessary to pull down the whole of the west front of the church. This has been rebuilt of red brick with terra-cotta facings, to the plans of Mr. Bidlake. The interior has also been decorated.

TEMPERANCE HALL, CARDIFF.—A temperance hall at Cardiff, erected at the expense of Mr. John Cory, was opened on the 9th inst. The building is situated near the Taff Vale Railway Station, and is constructed principally of Bath stone, relieved with Llantarnam red brick. A gallery goes round three sides of the interior of the building, and there are three separate staircases leading to it. On the side facing the main entrance, accommodation for an orchestra has been provided, and the hall will seat about 1,400 persons. Underneath the main hall is a room capable of seating about 400 persons, and there are several ante-rooms suitable for committee meetings, &c. The architects are Messrs. J. P. Jones, Richards, and Budgen, and the contractors Messrs. Evans Brothers. Messrs. James Stott & Co., of Manchester, carried out the lighting and ventilation work.

MODEL DWELLINGS, SOUTH SIDE, GLASGOW.—A large building is now in course of erection at the corner of Govan-road and Mair-street, Glasgow, which is intended as a superior kind of model dwellings. It is being constructed chiefly of brick, is five stories high, and is arranged for 536 inmates, each of whom is to have a roomy compartment, containing 550 cubic feet of air space, and cross ventilation. The ground floor is entirely taken up by the administrative departments which contain a dining-hall, 66 ft. by 35 ft.; a recreation and concert-room, 68 ft. by 35 ft.; a reading-room; a light and airy kitchen, with three large hot plates for cooking purposes; sculleries, lavatories' private bath-rooms, and men's and women's washing-houses, with hot-air drying-rooms, and white glazed tile walls throughout. Heat and hot water will be provided by a 30 horse-power steam boiler, which will also be capable of working dynamos for electric purposes, if required. The main entrance is from Govan-road, which leads to a corridor, 70 ft. long and 12 ft. wide, at the end of which is a well-lighted and spacious staircase, 28 ft. by 15 ft., leading to the dormitories. There is also, in a central position, an iron escape-stair on every floor, leading to the back of the main building. The cost of the building is not expected to exceed 15,000*l*., and the premises will probably be open about the end of the year. The architects are Messrs. Bruce & Hay, 261, West George-street, Glasgow.

ELECTRIC LIGHTING WORKS, SOUTH SHIELDS.—The town of South Shields is now supplied by electricity, which was laid on for the first time on the 9th inst. The works, which are from the designs of Mr. Jeckell, are plain, substantial structures, chiefly of red brick, and have been built by Messrs. Brown, of South Shields, the contract price, including that of clearing the site, having been 3,124*l*. The two boilers, which are of the ordinary marine type, were supplied by Messrs. Black, Hawthorn, & Co., Gateshead. The preference shown for this kind of boiler was questioned at the time, but has since commended itself, and other towns are also procuring marine boilers for their electricity works. The pumping plant, which comprises two large pumps for raising the circulating water from the Tyne, feed pumps to the boilers, together with the necessary tanks, was supplied by Messrs. Henry Watson & Sons, High Bridge Works, Newcastle. Messrs. S. Z. de Ferranti, Limited, London and Manchester, were the contractors for the whole of the electrical machinery, including the alternators, switch boards, rectifiers, transformers, and arc lamps and posts. The alternators are what are known as direct driven, with ironclad armatures. The engine alternators and exciters are all coupled direct to one shaft. Messrs. J. & H. MacLaren, of Leeds, have supplied the engines, which are of the ordinary triple expansion converted cylinder, marine type. The total cost of the machinery and plant, together with the cables laid in the streets, comes to about 20,000*l*., so that the venture has meant an initial outlay for South Shields of some 28,000*l*. In regard to the capacity of the works it may be stated that there are two large plants of 200 indicated horse-power. In ordinary working only one of these will be running, the other being kept in reserve. There is also a small plant of 35 indicated horse-power, which is to supply the current during the day, or the early hours of the morning, when the consumption will naturally be at the minimum. The total electrical capacity of the station is 215 kilowatts, and allowing sufficient for reserve, this will permit of 3,000 lamps of eight candle power being lit at one time; 7,000 lamps can in all be connected with the mains. The area for which provision has been made is comprised in the following streets, where mains have been laid:—East and West Holborn, Corporation-street, Church-row, Dean-street, Market Place, King-street, Ocean-road, Fowler-street, Westoe-lane (from Wellington-terrace to Victoria-road), Victoria-road, Cuthbert-street, Green-street, Laygate-lane (from Green-street to Trinity Church), and Laygate-street.

ST. THOMAS' CHURCH, BRISTOL. — Extensive improvements are being carried out in the tower of St. Thomas' Church, Bristol. The work of erecting the present building was completed in 1793. The original tower, which is in the Perpendicular style, was allowed to remain, but it has now become so dilapidated that much restoration is necessary. A considerable portion is being refaced, and a new parapet and pinnacles are being added. As far as possible the old lines of the tower are followed, and the surface is being disturbed only where the stone is decayed. The cost of the work amounts to about 1,600*l*. Mr. Gough, of Bridge-street, is the architect, and the work is being done by Messrs. Cowlin.

SANITARY AND ENGINEERING NEWS.

WATER SUPPLY, STRATTON AND BUDE.—At a meeting of the Stratton Sanitary Authority, on the 8th inst., the committee appointed to engage an expert to advise on the question of a water supply for Stratton and Bude reported that they had engaged the services of Mr. Baldwin Latham, C.E. The following is a summary of that engineer's report. It is necessary to supply water for the requirements of a population of not less than 3,000 with an allowance of 30 gallons per head per day, or 90,000 gallons per day on an average throughout the year; and it is desirable that even a larger supply should be procurable. Of the Wrasford Moor scheme, he says, judging from what he saw and the gaugings of the past, an impounding reservoir to contain 30,000,000 gallons would be necessary to meet all contingencies. There would thus be an ample supply, but it would be at a great cost, and it would be much more economical to impound water from the streams in the immediate neighbourhood than go such a great distance from the places to be supplied. The reservoir scheme would be the most economical if the agreement with the Canal Company could be carried out. It had been suggested that the Canal Company would part with all the concern for 3,000*l*., and as the water could be obtained direct from the canal reservoir a supply therefrom would be the cheapest and best scheme. The report deals with the sources of supply by gravitation nearer Stratton and Bude, with the estimated quantities and costs, but the engineer does not recommend them. As to collecting the water about Bude and Stratton and pumping to a storage reservoir, he considers the peculiar geological formation of the ground unfavourable to the supply of a large volume of underground water, and the scheme would be costly. In all the schemes except the pumping ones it was doubtful whether Parliamentary powers would not be required. The obtaining of such powers might be attended with great advantages in such an undertaking, and produce a net profit as compared with the terms of loan granted by the Local Government Board. On the whole, he favours the scheme for taking the water below the canal reservoir, as the works in this scheme could be executed more expeditiously than any other.

THE WATER, SEWERAGE, AND BATHS SCHEMES, LEEDS.—On the 15th inst. Mr. Rienzi Walton, M.I.C.E., one of the Inspectors of the Local Government Board, held an inquiry in the Council Chamber at Leeds Town Hall, with reference to an application from the Corporation to borrow 150,000*l*. for waterworks purposes, 100,000*l*. for works of sewerage, and 20,000*l*. for the erection of public baths in the township of Holbeck and Hunslet.

WATERWORKS, ALNWICK HILL.—The Edinburgh and District Water Trustees are at present engaged in greatly enlarging their filter beds and water storage accommodation at Alnwick Hill. These works were brought into existence in connexion with the Moorfoot water scheme, which received the assent of Parliament in 1874. The supply from this source, says the *Scotsman*, was estimated by Mr. Hawksley at 3,896,000 gallons per day, but it is only this year that the full capacity of the aqueduct and pipes from the Gladhouse reservoir has been brought into requisition. Alnwick Hill stands 400 ft. above sea-level, and the works originally constructed there comprised, on the highest point of the grounds, which are 28 acres in extent, an open storage reservoir capable of containing about 20,000,000 gallons of water. This was intended as a reserve for the supply of the city and district in case of accident to the pipes between the Gladhouse reservoir and Alnwick Hill. From this reservoir the filters, placed on a slightly lower level, are fed. At first there were only four filter beds of about 3,000 superficial yards each, but two more of the same size were added in 1888. From the filters the water passes into a large covered clear-water house, capable of holding 4,000,000 gallons, and from there into the measuring house, where are the great mains for its conveyance into the city. But with the increasing demand for water, especially during the hot summer weather, the six filters were found inadequate to keep up a supply of filtered water to the city; and accordingly it was resolved to construct two more, so that at least six would be continually in operation while two were being cleaned. From ten to twelve men are constantly engaged in cleaning the filters—three or four days being required for each filter. The two new filters are of the same capacity as the old ones. Their walls are of blue brick set in cement. The copings are large blocks of granite. The floor is a bed of solid concrete 6 in. thick. Upon this are laid large drain pipes with open joints, which gather up the water and convey it to the outlet pipes. Then come about 2 ft. of whinstone broken to the size of road metal; on the top of this are 9 in. of smaller stones; these in turn are covered by a layer of 6 in. of smaller stones almost like gravel, and on the top are 2 ft. of fine sand got for the most part from Musselburgh. There is also being constructed a new clear-water house, which will have a capacity of 5,000,000 gallons. This building, which is 380 ft. in length, 150 ft. wide, and 20 ft. in depth, will be completely covered over with a stone roof, in six sets of arches, built of brick and strongly grouted with cement. On the top of the arches earth will be spread, and shrubs planted, as on the roof of the existing clear-water house. The water is thereby kept cool. Ventilators are carried up through the masonry, and present the appearance of a series of pedestals along the length of the building. Alongside, a new measuring house is being constructed, the walls of which are lined with white enamelled bricks which give them a clean and cool appearance. Both of these buildings are of strong construction. Their walls are 6 ft. in thickness with 2 ft. of puddle behind them. The dimensions of the measuring-house are 50 ft. by 30 ft., and in it two 30-in. pipes for conveying the water to the town have been fitted into an archway on its east side. The new works, which are being carried out by Messrs. James Young & Sons, are likely to be ready by the end of the year. They are estimated to cost 30,000*l*. This will bring up the expenditure on Alnwick Hill to a total of 140,000*l*., which includes the expense of purchasing the land. At present the water at Alnwick Hill comes from the Moorfoot

and the South Pentlands, but with the new filters and clear-water house the works will be able to deal, if necessary, with the first instalment of the Talla scheme; though, in connexion with that project, power is taken to construct a service reservoir and filters at Fairmilehead, which is 600 ft. above sea-level, and lies about a mile and a half west of Alnwick Hill, with which it will be connected by large mains. The new works are being constructed under the superintendence of Mr. Wilson, the engineer of the Trust.

WATERWORKS, LEICESTER.—The new works of water supply at Swithland, which have been constructed by the Corporation of Leicester at a cost of about 360,000*l.*, were opened on the 10th inst. Until this was completed, the borough was mainly supplied from two reservoirs. One was constructed in 1854 at a cost of 108,081*l.*, and was supplied from a watershed of 2,860 acres. The second—that at Bradgate—was completed in 1870, at a cost of 181,000*l.*, and had a watershed of 4,400 acres. Owing, however, to the rapid growth of the population, and the decline in the average rainfall from 28 in. to only 20, both supplies have proved altogether inadequate, and have again and again led to a serious scarcity. The quest for a fresh supply began in 1880, but it was not until 1889 that the present Swithland scheme was adopted. The Corporation purchased 275 acres from the Earl of Lanesborough, at a cost of 52,303*l.* The detailed plans were prepared by Mr. J. B. Everard, C.E., of Leicester. In April, 1894, the Corporation accepted the tender of Messrs. Aird & Sons for the construction of the reservoir, filter-beds, &c., at 133,511*l.*, and in the following July the first sod was cut by the Chairman of the Water Committee, Alderman Wood, the present Mayor. The reservoir covers about 200 acres, and is comparatively shallow, but it will store 530,000,000 gals., and be fed by a water shed of 3,500 acres. It will accordingly yield 2,000,000 gals., per day, and will supply 100,000 at the rate of 20 gals. per head. The aggregate supply will thus be raised to 6,000,000 per day, and accordingly suffice for a population half as large again as the present. In addition a service reservoir has been constructed out of the solid rock at Hallgates, at a cost of about 15,000*l.* This will hold 2,000 000 gals. and materially improve the supply to the high-level districts of Leicester, and save about 1,500*l.* a year in pumping. The stonework throughout is of an ornamental character, and the entire waterworks constitute a prominent feature in Charnwood Forest. Among the contractors have been Messrs. T. Blakeborough & Sons, of Brighouse, Yorkshire, who have supplied the whole of the valves, &c., for the new Swithland works, at a sum of 8,372*l.*

PROPOSED WATERWORKS, BIRR, IRELAND.—An unexpected deadlock has occurred in the position of the question of providing a high-pressure water supply for Birr. Two years ago the Local Government Board, acting on a report of Dr. Stafford, urgently called the attention of the town commissioners, who constitute the urban sanitary authority, to the necessity in the interests of public health to have such works constructed immediately. Going into the question the commissioners found that the cost, about 12,000*l.*, was an unfairly heavy burden on the ratepayers within their limited taxable area, and that only by securing the co-operation of the Poor Law Guardians this area could be extended as far as required to secure an equitable incidence in rating. But the guardians decline to have anything to do with it, since it would involve a slight increase in the rates in the rural districts within a few miles radius of Birr. The commissioners have now plainly told the Local Government Board that for the reasons stated the Board's orders cannot be complied with, the commissioners having done all in their power in a vain effort to enlist the guardians' co-operation.—*Freeman's Journal.*

STAINED GLASS AND DECORATION.

EAST WINDOW, WICKHAMBREAUX.—The new window here is said to be the first piece of American stained glass set up in an English church. It is designed by Baron Rosenkrantz, and is painted in the material invented or concocted by Mr. Lafarge, the well-known American decorative artist. The subject is the Annunciation.

MEMORIAL TO BISHOP PHILPOT.—Mr. Broek's recumbent statue in memory of the late Bishop Philpot was unveiled in Worcester Cathedral on Saturday last, in a position in front of the nave organ case. The statue, which is in white marble on a pedestal of dark reddish alabaster, was exhibited at the Royal Academy this year. It was not a work to make a great impression there, but will probably look more in its place as a monument in a cathedral, a position to which it is exceedingly well suited.

FOREIGN.

FRANCE.—M. Girault, architect-in-chief for the large palace at the Paris Exhibition, and M. Deglane, the special architect for the front block, have submitted to the Committee of Direction a scheme for the principal facade bordering the Avenue des Invalides. This design, which has been definitely adopted, comprises three large portals surrounded by a Greek colonnade. There will be no dome over the building. The general plan is of the T-shape indicated in the design of M. Louvet. M. Girault's small palace will present on its principal face a large elliptical vestibule giving access on the right and left to two long galleries lighted from the principal avenue. The centre of the side will be occupied by a semi-circular garden surrounded by porticos.——Delaroche's celebrated picture, "The Young Martyr," which has been left to the State by M. Eichthal, has just been placed in the Louvre, in the gallery containing the works of Poussin.——The Paris, Lyons, and Mediterranean railway company are entering on a reconstruction of their terminal station in Paris on an immense scale, at an estimated cost of 18,700,000 fr. The whole scheme will take eight or ten years to carry out, but an effort will be made to get the most important portion of it finished by 1900.——The Government has authorised the formation of a "Société d'Assistance Confraternelle des Architectes," which will have its headquarters at Versailles.——A rope-railway is to be formed at Lyons, between the St. George railway station and Fourvières, to join the existing line between Lyons and the Faubourg St. Just.——The jury in the competition for the erection of an Asylum at Montpellier has awarded the first premium to M. Miguel, of Bèziers; the second to M. Debens, of Montpellier; and the third to M. Bourgeois, Borough Architect of Poissy.——The death is announced of M. Jules Constant, architect, of Paris.——A new line of railway is being made in Tunisia, to Zaghouan, intended to serve a very fertile region where there is room for further development of agricultural commerce.——A new Roman Catholic church is to be built at Taher, which will be one of the most important religious monuments in Algeria.——The Art Museum of Troyes has secured several new works in sculpture by M. Boucher, including the tomb of the Duchess of Vicenza and the statue exhibited at the Salon of 1895 under the title "Volubilis."——A system of electric lifts has been established at the Hôtel des Postes at Paris, which is exceedingly successful in its rapidity and regularity of working.

MISCELLANEOUS.

A NEW WEEKLY PAPER.—We have received the first number of *The New Saturday*, "a Journal of Literature, Finance, and Independent Politics," which promises well in regard to general style and ability. There is no promise as yet of any of its space being devoted to artistic subjects, but perhaps that is to come.

PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.—Mr. Horace Field, architect, has removed to 1, Langham Chambers, All Souls' Place, Regent-street.——Mr. J. B. Broadbent, architect, has removed from 1, Princess-street, to 15, Cooper-street, Manchester.

BELGIAN CEMENT FOR SOUTH AFRICA.—The Antwerp correspondent of the *Liverpool Journal of Commerce* says:—"The freights for the conveyance of Belgian cement to South Africa having been considerably reduced, mainly owing to the reports of the Belgian Consul-General, there has been a corresponding advance in the import of that article into that country. The consequence is that it is driving English and German cements entirely out of the South African markets, a result which is stated to be equally due to the far superior quality and lower price of the Belgian product."

NEW CLOCK TOWER, BRIGHTON.—A clock tower has just been erected at the Blaker Recreation Ground, Brighton, presented by the Mayor of Brighton at a cost of some £400. It is a square structure made entirely of steel and cast iron, 50 ft. high. The clock, which is placed in the base of the tower, is constructed to strike the hours in addition to showing the time. Provision has been made for illuminating the dials at night, and the gas will be turned up and down automatically. The clock is by Messrs. Gillet & Johnston, of Croydon, to whom, apparently, the designing of the tower seems also to have been left.

THE SOCIETY OF MINIATURE PAINTERS.—The private view of the inaugural exhibition of this Society will be held at the Gallery, 175, New Bond-street, on Tuesday next, the 22nd inst. The exhibition will be open to the public daily from the 23rd inst. to the 17th of October.

AN INDICATING ELECTRIC BELL PUSH.—We have received from Mr. Creasey, of Fife-road, Kingston-on-Thames, a model of a combined bell-push and indicator which he has designed. The push is of the ordinary shape and size, but the button is placed in the lower half of it. Above the button there is a small circular window, and behind it a small paper wheel which rapidly oscillates and revolves when the interrupted current flows along the bell-wire—that is, as long as the bell continues ringing. The mechanism is exceedingly simple, consisting of a small piece of iron, round which a few turns of wire are coiled, and which is in series with the main circuit. On the back of the paper wheel is a small magnetic needle which is violently acted on by the magnetism induced in the piece of iron at the moments when the circuit is completed. We have experimented with this indicator, and found that it answered its purpose exceedingly well, it being practically impossible to get the needle at a "dead point." It is difficult to see how such a simple piece of mechanism could get out of order, and it is strongly made. It may also be used as a rough guide to show the state of the batteries and connections in the circuit.

CHURCH STEEPLE WRECKED, LAMBERHURST.—A terrific thunderstorm passed over the village of Lamberhurst on the night of the 8th inst., which, according to the *Tunbridge Wells Courier*, did a considerable amount of damage to the old Parish Church of St. Mary. The greatest damage was, however, confined to the steeple, which is a complete wreck. Some of the rafters were forcibly rent asunder, one especially being thrown out into the churchyard some yards away, just falling short of an iron fence and monument. On inspecting the bells it was found that some large pieces of timber were torn from their places, and others very much shattered. The stone work is not so much injured as was expected; nor are the bells damaged. The large window in the gallery at the west end of the church is very much shaken, and also the stone work at the gable. A piece of stone was thrown out close by the font in the chancel some distance from the steeple. Happily the main structure is not much damaged.

LEGAL.

THE PARTY-WALL DISPUTE AT HALIFAX:

CASE IN THE VACATION COURT.

THE case of Simpson & Sons, Limited, *v.* Collinson came again before Mr. Justice Chitty, sitting as Vacation Judge, on the 9th inst., on a motion on behalf of the plaintiffs that the defendant, his contractors, servants, agents, and workmen might be restrained until the trial of the action or further order from entering on the land and premises of the plaintiffs situated in Skircoat-road, Halifax, in the county of York, and from heightening or building on the wall dividing the said land and premises of the plaintiffs from the adjoining land and premises of the defendant, or any part thereof, and from pulling down or otherwise damaging or interfering with the property of the plaintiffs, and for such order or other relief as the Court might direct. The case was reported in the *Builder* of the 5th inst.

Upon the case being called on, Mr. Millar, for the plaintiffs, said that the defendant had had more than a week to get up his evidence, but that some of it was withheld until a late hour. He supposed that the order made last week would continue till next motion day.

Mr. Alexander, Q.C., on behalf of the defendant, said he should object to that. They had got to a period of the year when windy weather might be expected, and his client was afraid that a gust of wind would come and knock the whole thing down.

In answer to the judge, Mr. Alexander said that the wall was now nearly completed, and when finished it would support the plaintiffs' roof. It had been found necessary to prop plaintiffs' roof up. Affidavits had been sworn to the effect that unless the work proceeded there was danger every hour. He would give an undertaking to "pull down."

His Lordship: You must do more. (To Mr. Millar). You say the defendant has no right to build on the top of the wall?

Mr. Millar: Yes, we say the defendant has no right to build there.

His Lordship: The trellis-work was there before.

Mr. Millar: It was entirely our trellis-work, and to which the defendant had no title whatever. The position of things has been this: The trellis-work was put up by me, and the trellis-work the defendant has pulled down was actually on my own land.

His Lordship: Do you claim the buttresses as yours?

Mr. Millar: Yes. After two years, and after being consulted by us for two years, the defendant, after the commencement of the Long Vacation, sends eight or ten workmen to pull down part of the wall.

His Lordship: He has pulled down the pillars themselves and the trellis-work.

Mr. Millar: Yes. He has damaged the roof and removed coping stones.

His Lordship: Mr. Alexander says your roof is in danger.

Mr. Millar: I am content to accept the dangerous position, and I object entirely to anything which will allow the defendant to deal with anything on the wall.

His Lordship: Would you allow Mr. Alexander to finish this work upon his giving an undertaking to "pull down" on the motion being heard?

Mr. Millar: I am told it would ruin our trade. The injury is very great.

His Lordship: Then I must continue the order.

Mr. Millar: Your lordship will continue the order over the Vacation?

His Lordship: Yes.

The Court therefore continued the order for an injunction over the Vacation restraining the defendant in the terms of the notice of motion.

COMPETITION, CONTRACTS, AND PUBLIC APPOINTMENTS.

COMPETITION.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered.
*New Hospital, Newport	Newport & Monmouth Hospital Committee	100l. and 50l.	Dec. 1

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c. Supplied by	Tenders to be delivered.
Sewering, Levelling, &c. Park-street to Hall-street	Brighouse (Yorks) T.C.	E. Brooke, Boro' Surv. Public Offices	Sept. 22
Levelling, Forming, &c. Shaw-road	Dudley Corporation	J. Gammage, Boro' Surv. Town Hall, Dudley	do.
Forty Cottages, Tyr Arlwydd Estate, Mountain Ash, Glam.	Springfield Bldg Soc.	R. Edwards, Pantannas Estate Office, Treharris	do.
*Making-up Roads, &c.	Tottenham U.D.C.	P. E. Murphy, Engr. 712, High-rd. Tottenham	do.
Paving Setts (2,200 tons)	Limerick Corporation	W. E. Corbett, C.E. 28, Glentworth-st. Limerick	do.
Pair of Houses, Herne Bay	.....	T. E. Hcrwell, Hillside, Beltinge-rd. Herne Bay	do.
Wards at Infirmary, Hereford	.....	Nicholson & Hartree, Archts. Hereford	do.
Three Houses and Outbuildings, Dobie-street, Barnsley	.....	H. Crawshaw, Archt. 13, Regent-street, Barnsley	do.
Eight Cottages and Shop, Bramley station, Leeds	.....	J. P. Kay, Archt. 34, Prudential-buildings, Leeds	Sept. 23
Guernsey Granite	Hadleigh (Suffolk) U.D.C.	C. J. Grimwade, Council Offices	do.
Stables, &c. Longshot-lane	Eastham-stead R.D.C.	C. J. Cave, Clerk, Bracknell	do.
Forming, Metalling, &c. Pentrebane-street	Cardiff Corporation	W. Harpur, C.E. Town Hall	do.
Alterations, &c. Business Premises, Victoria-street, Grimsby	A. W. Simons	H. C. Scaping, Archt. Grimsby	do.
Metalling, Kerbing, Rebecca-street	Barnsley T.C.	J. H. Taylor, C.E. 6, St. Mary's-place	do.
*Paving Yard and Materials for same	Islington Guardians	R Davey, Offices, St. John's road, Upper Holloway, N.	Sept. 24
Additions to School	South Shoeburyness Sch. Bd.	Burles & Harris, Archts. Clarence-st. Southend	do.
Church, York-road, Belfast	Committee of Castleton Presbyterian Church	Young & Mackenzie, Archts Donegal-sq -east, Belfast	do.
Pair Semi-detached Houses, St. Martin's-road, Dorchester	.....	J. Feacey, Archt. Southwalks, Dorchester	do.
Improvement to City-square, Leeds	.....	W. Bakewell, Archt. 39, Park-square, Leeds	do.
Concrete Flags (620 yards)	Northallerton U.D.C.	W. Fowle, Clerk, Council Offices	Sept. 23
Church Restoration, Tremadoc, Wales	Committee	Thomas Roberts & Son, Archt. Portmadoc	do.
Widening St. Thomas'-road, Normanton	Shardlow R.D.C.	W. G. Briggs, Surv. Alvaston, Derby	do.
Foundations and Building East Hull Baths	Hull Corporation	A. E. White, Boro' Engr. Town Hall, Hull	do.
*Rebuilding Police Offices, Court, &c	Coventry Corporation	H. Quick, Hertford-street, Coventry	Sept. 26
Street Works, Stanley-road	Blackpool Corp.	J. Wolstenholme, C.E. Market-street, Blackpool	do.
Offices, North street, Horsham	Snell & Luckin	C. H. Burstow, Archt. 40, North-street, Horsham	do.
Timber Carriage Shed, Dundalk	G. N. R. Co. (Ireland)	Engineer in Chief, Amiens-street Terminus, Dublin	do.
Farm, Asylum Estate, Whitecroft, Isle of Wight	Committee of Visitors	W. H. Wooldridge, Clerk, 20, Holyrood-st Newport, I. W	do.
Granite Road Metal	Bishop Stortford U.D.C.	W. Gee, Council Offices, North-st	do.

CONTRACTS—*Continued.*

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c. Supplied by	Tenders to be delivered.
Reading Room and Institute, Ingleton, West Riding	.....	H. Ross, Archt. 15, Cannon-street, Accrington	Sept. 28
Sewer, Upper Gordon-rd. Camberley	Frimley U.D.C	W. J. Hodgson, C.E. High-st. Camberley	Sept. 28
*Oak Park Fencing	Hove U.D.C.	Town Surveyor, Town Hall	do.
*Extension of Sewerage System	Willesden U.D.C.	O. Claud Robson, Public Offices, Kilburn, N.W.	Sept. 29
Cloak Room, Shed, &c. at School Felling Shore	Heworth Sch. Bd.	H. Miller, Archt. Board Offices, Felling	do.
Additions to School, Church-st.	Swadlincote Sch. Bd.	T. Buckley, Clerk, Gresley Wood House, Swadlincote	do.
Mortuary, Durham County Hospital	.....	C. H. Fowler, Archt. The College, Durham	do.
Distillery, Cameron Bridge, Elgin	.....	C. C Doig, Archt. Elgin	Sept. 30
Pair of Houses, Sewage Pumping Station, Constantine-rd. Ipswich	.....	Mr. Buckham, Boro' Surv. Town Hall, Ipswich	do.
Street Improvements, Oak-st. &c.	Middleton (Lancs.) Corp.	W. Wilburn, Boro' Surv. Town Hall	do.
Water Supply Works	Northallerton Union	Fairbank & Son, C.E. 17a, Lendal, York	do.
Two Cottages, Llandudno	Carnarvonshire C.C.	County Surv. 8, Castle-st. Carnarvon	do.
Hospital	Wlodermere & Bowness U.D.C.	R. Walker, Archt. Windermere	Oct. 1
Pipe Sewers, &c. Cortonwood	Rotherham R.D.C.	B. Godfrey, C.E. 26, Moorgate-st. Rotherham	Oct. 3
Sea Wall, Promenade, &c. East View	Morecambe U.D.C.	Jno. Bond, Surv. Council Offices	Oct. 5
*Painting, &c.	St. Marylebone Guar.	A Saxon Snell, 22, Southampton-buildings, W.C.	do.
*Laying 1,245 feet Pipe Sewer	Southend Corp.	H. Harlock, Town Hall	Oct. 6
*Levelling, Paving, &c. &c. Streets	do.	do.	do.
*Re-building Finchley Bridge	Middlesex C.C.	Surveyor, Guildhall, Westminster	Oct. 7
*Sorters' Office, Reading Station	Commrs. H.M. Works	12, Whitehall-place, S.W.	do.
School Extension, Cacgarw, Mountain Ash	Llanwonno Sch. Bd.	A. O. Evans, Archt. Pentypridd	do.
Additions, &c. to Town Hall	Brighton T.C.	F. J. C. May, C.E. Town Hall	Oct. 9
Two Stone Bridges, Dorstone, Herefordshire	Bredwardine R.D.C.	C. Griffiths, Clerk, Hay, R.S.O.	Oct. 10
Stables and Sheds, Butcher-lane, Bury	Sutton & Co.	F. Cartwright, C.E. Phoenix-yard, Bolton-st. Bury	No date
Additions, &c. to Half Way House Hotel, Cardiff	Brain & Co.	Jones & Co. Archt. 18, St. Mary-st. Cardiff	do.
*Club	Sheerness Conservative Club	W. J. Shearburn, Dorking	do.
Thirty Houses, Saltwell-lane District	Gateshead Indus. Co-op. Soc. Ld.	E. Bowman, Archt. 32, Westgate-rd. Newcastle	do.
Bakery and Shops, Stapleford	Co-op. Soc. Ld.	E. R. Ridgway, Archt. Long Eaton	do.
New Road, Station-rd. to Brown-lane	Beeston (Notts.) U.D.C.	H. J. Price, Archt 24, Low-Pavement, Nottingham	do.
Brick Culvert, Liverpool-rd. Eccles, Lanes.	.....	A. C. Turley, C.E. Eccles	do.
National Schools, Galley Common, Nuneaton	.....	Veal & Sant, Archt. Wolverhampton	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised	Salary.	Applications to be in.
*Architect's Assistant	Norwich Corporation	.....	Sept. 28
*First and Third Assistant Engineers	Singapore Municipal Commrs.	1st, 250 dols. &c. per month, 3rd, 150 dols. &c. per month	Sept. 30
*Assistant Surveyors (R.E. Civil Staff)	Civil Service Commrs.	.....	Oct. 8

Those marked with an asterisk (*) are advertised in this Number. *Competition, p.* iv. *Contracts, pp.* iv., vi., *&* viii. *Public Appointments, pp.* xvi. *&* xix.

The case again came on before Mr. Justice Chitty on Wednesday the 16th inst.

Mr. Millar, Q.C., and Mr. Stuart Smith appeared as counsel for the plaintiffs, and Mr. Alexander, Q.C., and Mr. H. Dobb, for the defendant.

Mr. Millar, in opening the plaintiff's case, said that the defendant had interfered with the plaintiff's wall by pulling it down, digging into a chimney, removing some trellis work, and cutting away the floor-boards of the plaintiff's shed, and also cutting away the supports of the shed. The plaintiffs were cabinetmakers and upholsterers in Halifax, and the defendant was a coal merchant living near them. According to an award made as long ago as 1893 by Mr. Samuel Utley, an architect and surveyor, of Halifax, which had not been impeached or complained of in any way by either party, the plaintiffs were to construct a wall to his satisfaction between two points 6 ft. above a certain level, and the parties were to pay the costs between them, and if either of the said parties to the agreement should higher the wall and the other party should use the part so highered, he should pay one half of the cost of the part so used.

His lordship said that he was not going to hear the motion out at this time of the year, and he must find a *modus vivendi* for the parties until the second motion day next sittings.

Mr. Millar said that the defendant had pulled down some of the wall. It was necessary for the plaintiffs, as cabinetmakers, to have a good circulation of air for their wood.

His lordship said there was no power to pull down the wall.

Mr. Millar replied that there was not. One of the parties had built the wall, and that had been acquiesced in for two years.

Mr. Alexander, Q.C., maintained that the defendant was right, and that the plantiffs' shed was in a better position than before by what the defendant was going to do and was willing to do.

His Lordship asked what the state of the wall was?

Mr. Millar replied that the pillars had been damaged by the defendant, and some coping stones had been removed.

His Lordship said that the photographs and plans before him seemed to show that there had been a great alteration.

Mr. Alexander said he would give an undertaking to pull down the wall if ordered to do so at the trial.

His Lordship: Is there a grand question of right, or of neighbourly feeling?

Mr. Millar: The neighbourly feeling is shown by the defendant putting eight or a dozen men on the land to pull down the wall.

His Lordship: They cannot go on your land.

Mr. Millar: But they do go.

After some further discussion, his Lordship said that he proposed to take Mr. Alexander's undertaking to "pull down" and say no more about the motion. He would give the plaintiff leave to set down the action at once and to deliver pleadings during the vacation.

Mr. Millar: They must not trespass on our land.

His Lordship: They must undertake not to come on your land. I will grant an injunction if they will not give that undertaking.

Mr. Alexander said that he would give that undertaking, and his Lordship, subject to the time stated, made no order on the motion except that the costs should be costs in the action.

MEETINGS.

SATURDAY, SEPTEMBER 19.

Northern Architectural Association. — Visit to the Cathedral Tower, Newcastle. 3 p.m.

SATURDAY, SEPTEMBER 26.

Devon and Exeter Architectural Society.—Excursion to Truro Cathedral. Leave Plymouth 1.20 p.m.

Association of Municipal and County Engineers.—Western Counties District Meeting, Bristol. Commence 12.15.

London and Provincial Builders' Foremen's Association.—Meeting at Memorial Hall, Farringdon-road. 7.30 p.m.

RECENT PATENTS:

ABSTRACTS OF SPECIFICATIONS.

18,909.—HOT-WATER PIPES: *W. Culver.*—Invention consists in forming pipes for hot-water heating apparatus of an oblong or rectangular section, by which alteration it is claimed a less amount of water is required for heating pipes than if they were of circular form.

18,438.—FLUSHING CISTERNS: *T. Clark.*—Improvements consist in (1) a lead syphon with a bell mouth or shortened limb; (2) a plunger box having a shoe piece at bottom, with top of opening immediately under the bell mouth of the syphon; (3) a plunger having a concave bottom; (4) a nicely-balanced lever running the whole length of the cistern; (5) an india-rubber buffer at each end of the cistern; and (7) a regulator screw to regulate water way.

19,167.—WINDOWS: *W. L. Edgar.*—Each sash is made in the form of a sliding frame, which is cut out for the reception of an inner sash. This latter sash, which is hinged at one side to the sliding frame, is glazed, and capable of being turned on hinges like a door. When under sash is closed into sliding frame, it can be secured by a catch, bolt, or lock. The sliding frame is hung, as usual, upon the weight cords, and can be raised or lowered in the ordinary manner.

18,460. — PAINTERS' "BURNING-OFF" STOVES: *C. Credland.*—Inventor adopts, in a "burning-off" stove for painters' use, removable front bars or a grate sliding on grooves at the sides of the stove, also the use of a guard of asbestos millboard or other non-combustible material.

19,290.—APPLIANCES FOR SASH WINDOWS AND DOORS: *T. Bailey.*—Consists essentially in the adoption of appliances to support vertically sliding sashes and doors, such appliances consisting of a spring catch on each side of the window-frame and a rack on each side of the sash or door. Form and action of inventor's spring catch is described in great detail.

21,285.—WINDOW AND DOOR FASTENER: *J. E. Burman.*—Inventor fixes a vertically revolving pin fitted in a plate on bottom rail of top sash of window, and to upper end of pin hinges a short arm horizontally. The said arm constitutes the catch, and its free end is formed into a spring to engage with a jaw piece which is screwed on opposite rail.

15,274.—BRICKS: *G. Thieniche.*—Relates to an interlocking back for flat arches, and vaults for roofing and ceiling construction. Brick is provided on one longitudinal side with a groove and on the opposite side with a corresponding fillet or tongue.

NEW APPLICATIONS FOR LETTERS PATENT.

AUGUST 31.—19,154, W. Thickett, Racket Skylight Grip.—19,177, J. Shanks, Siphonal Cisterns for Water-closets.—19,200, J. Browne, Ventilator for Rooms, Halls, Public Buildings, Chimneys, &c.—19,213, C. Lyte, Mosaic Tile, Cement, Parquet, and like Flooring or Paving.

SEPTEMBER 1.—19,330, C. Haijke, Skylight Windows.—19,338, D. Kenney, Water-closets and Flushing Devices.

SEPTEMBER 2.—19,349, J. Loving and H. White, Fire-grates, Grilling and Cooking Ranges, &c.—19,372, H. Western and J. Mayer, Ventilator.—19,385, J. Dean, Anti-drip Glazing Bar.—19,392, F. & A. Woodward, Fastenings for Sliding Window-sashes.—19,404, H. Davies, Locks for Doors, &c.—19,419. A. McLean, Artificial Stone.—19,424, J. Spragg and W. Bowler, Hooks for Securing Lead Flushings, Water-pipes, Gas-pipes, &c.—19,441, C. Gottchan, Hinges for Doors, &c.

SEPTEMBER 3.—19,451, J. Taylor, Self-acting Outlet Ventilator.—19,486, W. Hartley and S. Bennett, Sash and Casement Fasteners, &c.—19,509, G. Förster, Automatically Closing Doors.

SEPTEMBER 4.—19,547, J. Page, Tip-Waggons.—19,575, I. Russell, Double-Sealed Stench or Gulley Traps.—19,562, J. Jones, Manufacture of Bricks.—19,568, S. Pearson, Automatic Flushing Arrangement.—19,582, G. Root, Sash Fastener.—19,592, E. Inman, Fire Grates.

SEPTEMBER 5.—19,654.—T. and W. Thomasson, Waste Water Pipes of Domestic Sinks, Baths, &c.—19,695, R. McHardy, Door Knob Spindles and Fittings.—19,698. A. Mâtrai and others, Construction of Walls, Floors, Ceilings, &c.

PROVISIONAL SPECIFICATIONS ACCEPTED.

16,008, H. Harris, Compressed Air and Cowl Apparatus for the Ventilation of Tunnels, Buildings, &c.—16,141, C. Shields, Gates.—17,078, H. Aird & C. Felch, Paint.—17,466, E. Freeman, Door Knobs, and in the Modes and Means of Attachment.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to opposition for two months.

16,661, J. Thomlinson, Plaster, Cement, Mortar, &c.—19,383, P. Willis, Ladders, and Carriages therefor.—11,609, S. Schofield, Grindstones.—16,126, E. Hartshorn, Fastenings for attaching Window Shades to Rollers.—16,427, J. Jones, Pipe or Drain Stoppers.—16,399. C. Köster, Composition for the Manufacture of Artificial Veneers.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

August 31.—By ROWBOTHAM & CO. (at Worthing).

Worthing, Sussex.—High-st., &c., fifteen plots of land, f.	£3,670
Warwick Gardens, three plots of land, f.	484

September 2.—By WALKER & SONS (at Kirby-moorside).

Kirbymoorside, Yorks.—Enclosure of land, 14 a. 0 r. 20 p., f.	930
Welburn, Yorks.—Freehold house and 6 a. 2 r. 21 p.	555

September 3.—By R. SNELL (at Axminster).

Axminster, Devon.—"Yeatland's Farm," 89 acres, f.	3,200

By GUDGEON, SONS, & CO. (at Alresford).

Houghton, Hants.—"North Houghton Coetage," and 18 a. 3 r. 13 p., f.	730

September 5.—FOX & VERGETTE (at Peterborough).

Werrington, Northants.—"Werrington Hall," and 48 a. 2 r. 32 p., f. and c.	3,850
Newark, Northants.—Enclosures of land, 39 a. 2 r. 5 p., f.	1,725

September 7.—By MESSRS. SPELMAN (at Norwich).

Norwich, Norfolk.—11, 13, and 15, Oxford-st., f....	830
10, Grove-st., f.	500

September 8.—By A. PRESTON (at Ipswich).

Henley, &c., Suffolk.—"The Hill Farm," 126 a. 3 r. f.	1,800

By WATERS & RAWLENCE (at Salisbury).

Great Durnford, Wilts.—A Freehold Farm, containing 189 a. 1 r. 16 p.	1,490

September 9.—By WESTON & SONS.

Brixton.—86, Brandon-rd., f. e.r. 28*l.*	360
Clapham.—1 and 3, Klea-av., u.t. 88¼ yrs., g.r. 13*l.* 10*s.*	465
Stockwell.—10, 12, and 14, Burgoyne-rd., u.t. 68¼ yrs., g.r. 14*l.* 15*s.*	705

By OSBORN & MERCER.

Bushey Heath, Herts.—London-rd., enclosures of land, 7a. or. 36p., f.	2,425
London-rd., "Beaconsfield" and "Primrose" Cottages, f.	600
Windmill-lane, enclosures of land, 8a. 1r. 31p. f.	850
Windmill-lane, two building plots, f.	410
The Ruts, "The Old House," and 1a. 3r. 1p., f.	750
The Ruts, an enclosure of land, 1a. 3r. 38p., f.	230

September 10.—By BELL & WILLATS.

Forest Hill.—161, Devonshire-rd., u.t. 71¼ yrs., g.r. 6*l.*	410

Contractions used in these Lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace cres. or crescent; yd. for yard, &c.

PRICES CURRENT OF MATERIALS.

TIMBER.

Greenheart, B.G. ton	£6/0/0	£9/0/0
Teak, E.I. ..load	£11/0/0	£16/0/0
Sequoia, U.S.ft.cu	0/0	0/1
Ash, Canada load	2/15/0	4/0/0
Birch, do.	3/5/0	5/0/0
Elm, do.	3/10/0	4/15/0
Fir, Dantzic, &c..	£1/15/0	£3/15/0
Oak, do.	2/10/0	3/10/0
Canada	5/0/0	£1/10/0
Pine, Canada red	0/0/0	0/0/0
Do. Yellow	2/0/0	4/5/0
Lath, Dantsic, fath	4/10/0	5/10/0
St. Petersburg..	5/0/0	£1/10/0
Wainscot, Riga &c., log	2/0/0	4/5/0
Odessa, crown	2/0/0	4/5/0
Deals, Finland and ¼ rst std 120	7/10/0	9/0/0
Do. 4th & 3rd	7/10/0	£1/10/0
Do. Riga	7/0/0	£1/0/0
St. Petersburg, 1st yellow	£1/10/0	13/0/0
Do. and yellow	£1/0/0	£1/10/0
Do. white	9/0/0	£1/10/0
Swedish	7/10/0	£1/0/0
White Sea	£1/10/0	£1/10/0
Canada, Pine 1st	£2/0/0	£2/10/0
Do. do. and	£1/0/0	£1/0/0
Do. do. 3rd, &c.	7/10/0	10/0/0
Do. Spruce, 1st.	£1/0/0	£1/10/0
Do. do. 3rd and	£1/10/0	£1/10/0
New Brunswick	£1/0/0	£1/0/0
Battens, all kinds	£1/0/0	£1/0/0
Flooring boards, sq., 1 in. prep. 1st.	£1/6/0	£1/4/0
Do. and	£1/0/0	£1/8/0
Other qualities	0/4/6	0/6/0
Cedar, Cuba, .ft.	/4½	/5
Honduras, &c.	/4	/5
Mahogany, Cuba	/4½	/8
St. Domingo cargo av.	/4½	£1/3
Mexican, do. do.	/4	/5
Tobasco, do. do.	/5	/7
Honduras, do.	/5	/6½
Box, Turkey ton	£1/0/0	£1/5/0
Rose, Rio	£1/0/0	£1/0/0
Bahia	£1/0/0	£1/5/0
Satin, St. Doming	0/0/7	0/1/0
Satin, Porto Rico	0/0/7	0/1/6
Walnut, Italian	0/0/3	0/0/7

METALS.

Iron—Pig, in Scotland ton	£5/6/4	£5/0/0
Bar, Welsh, in London	£5/15/0	£5/17/6
Do. do. at works in Wales	£5/10/0	£5/12/6
Do. Staffordshire, in London	£5/15/0	£6/10/0
COPPER—British cake and ingot	£1/10/0	£2/10/0
Best selected	£2/10/0	£2/0/0
Sheets, strong	£5/0/0	£7/0/0
Chili bars	£8/1/3	£8/8/9
YELLOW METAL lb	4d	0/0/5½
LEAD—Pig, Spanish ton	£1/2/6	£1/3/9
English com. brands	£1/5/0	£1/7/6
Sheet, English 6 lbs. per sq. ft and upwards	£2/0/0	£/0/0
Pipe	£2/10/0	0/0/0
ZINC—English sheet ton	£20/10/0	0/0/0
Vieille Montagne	£2/5/0	0/0/0
Spelter	£1/5/0	£1/7/6
TIN—Straits	£3/6/3	0/0/0
Australian	£2/5/0	0/0/0
English Ingots	£2/0/0	£3/0/0
Banca	£2/0/0	£2/10/0
Billiton	£2/5/0	£2/10/0

OILS.

Linseed ton	£6/10/0	0/0/0
Cocoanut, Cochin	£7/0/0	0/0/0
Do. Ceylon	£3/10/0	0/0/0
Palm, Lagos	£1/10/0	0/0/0
Rapeseed, English pale	£5/10/0	£6/0/0
Do. brown	£4/0/0	£4/10/0
Cottonseed refi.	£5/10/0	£5/10/0
Oleine	£2/0/0	£2/0/0
Lubricating U.S.	0/5/0	0/7/3
Do. black	0/4/9	0/6/6
TAR—Stockholm barrel	£1/5	0/0/0
Archangel	£1/12/6	0/0/0
TURPENTINE—(American) ton	£8/15/0	0/0/0

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m. on Thursdays.* N.B.—We cannot publish Tenders unless authenticated by the name and address of the sender: and we cannot publish announcements of Tenders accepted unless the amount of the Tender is given, nor any list in which the lowest Tender is under £100, unless in some exceptional cases and for special reasons.]

ANERLEY.—For additions and alterations to "Clarence Hall," Anerley, for Sir John Blundell Maple. Mr. Percival Brown, architect, 9, Walbrook, E.C.:—

H. Beacon	£371	Henry Loney*	£252
W. Baker	266		

* Accepted.

BAMPTON (Devon).—For the restoration of the parish church. Mr. C. H. Samson, architect, The Laurels, Taunton:—

Luscombe & Son	£2,992	Berry	£1,953
Harry Hems & Sons	2,557	Bryant	1,689
Luxton	2,032		

BOURNEMOUTH.—For making up Argyll-road, Boscombe. Mr. F. W. Lacey, Borough Engineer and Surveyor:—

S. Saunders	£135 19 0	W. H. Saunders & Co. (accepted)	£115 0 0
George Tuke	115 7 7		

BRADFORD.—For the erection of shops, warehouse, and club premises, Otley-road. Mr. Fredk. Wild, architect, 7, Charles-street, Bradford:—

Excavating and Masonry.—J. Pratt	£1,430 0
Carpentery and Joinery.—G. Demaine & Son	1,053 0
Plumbing and Glazing.—L. Brook	252 10
Plastering.—W. H. Hargreaves	146 0
Ironwork—E. & W. H. Haley	71 10
Slating.—Hill & Nelson	134 0
Painting.—G. J. Walton	26 5

[All of Bradford.]

BUCKHURST HILL (Essex).—For alterations, shop front, and fittings, No. 5, Victoria-terrace, Queen's-road, Buckhurst Hill, for the International Tea Company, Limited. Mr. Cecil A. Sharp, architect, 59, Fenchurch-street, E.C.:—

J. Oldroyd	£296 10	H. Wells & Sons*	£288 0

* Work to be done afterwards revised. Accepted tender, £296.

CAMBERLEY (Surrey).—For the construction of a sewer, Plantation-road, for the Frimley Urban District Council. Mr. W. J. Hodgson, C.E., Council Offices, High-street, Camberley:—

Cacker & Son	£198 12 0	W. See & Son	£136 0 0
Watson	195 0 0	G. Hebburn	135 0 0
Swaker	190 0 0	H. Lea	130 12 0
Wheeler	160 0 0	Stuart & Turner, Gracechurch-street*	124 17 6
J. Porter	140 0 0		
J. Free & Sons	140 0 0		

* Accepted.

CARLISLE.—Accepted for the erection of a shop and four houses, Port-road, for the Carlisle South-end Co-operative Society, Limited. Mr. J. Slack, architect, 18, Bank-street, Carlisle:—

Building and Joinery.—J. Hindson	£1,641 5
Plumbing.—C. McDonald	
Slating.—J. Hewitson	
Plastering.—S. Ferguson & Sons	
Painting and Glazing.—T. Nelson & Sons	

[All of Carlisle.]

CHERTSEY.—For the erection of two pairs semi-detached cottages, Almoners, Chertsey, for Mr. R. Bretteil. Mr. Chas. Welch, architect, London-street, Chertsey:—

H. G. Nesmyth	£836 0	T. Legg	£700 0
C. J. Blayney	815 0	G. Gray	692 15
Knight & Sons	770 0	C. Buckeridge, Egham*	667 0
G. Wells	734 10		

* Accepted.

CROYDON.—For improvements, new tanks, machinery, &c., to sewage-disposal works at Merton, for the Croydon Rural District Council. Mr. George Chatterton, engineer, Westminster, S.W.:—

G. Osenton	£20,005	W. Cunliffe, Kingston-on-Thames*	£15,767
E. Iles	17,947		
Cooke & Co.	15,875		

* Accepted.

CROYDON.—For shop fittings at No. 116, orth-end. Mr. A. Broad, architect, Croydon:—

E. P. Bulled & Co.	£485	Hanscomb & Smith	£427
D. W. Barker	467	S. Hart*	397
W. Marriage & Co.	430		

* Accepted.

ECCLES (Lancs.).—For the construction of two sets of underground conveniences, Eccles and Barton, for the Corporation. Mr. A. C. Turley, C.E., Town Hall, Eccles:—

N. Brookes & Son, Patricroft £830

[Accepted by Sanitary Committee subject to confirmation by Council.]

[Borough Engineer's estimate for each, £406.]

FRODINGHAM (Lincs.).—For the supply of broken granite at Frodingham Station for the Urban District Council. Mr. John Spavin, surveyor:—

	Per ton. s. d.		Per ton. s. d.
Lyon & Co.	14 7	Summerfield & Mead	11 3
Ord & Maddison	12 8	Kaltenbach & Schmitz	11 0
Thomas Feather	12 4	Matthew Jackson	11 0
Croft Granite Co.	12 3	Whitwick Granite Company	10 11
Grimley & Son	12 2	Narboro' & Enderby	10 6
Narboro' & Enderby	12 0	Brunton & Co.	10 6
Ellis & Everard	12 0		
Mount Sorrel Granite Company, Mount Sorrel*	11 9		

* Accepted.

GUILDFORD.—For the erection of nurses quarters, Royal Surrey County Hospital, Guildford. Mr. W. G. Lower, architect, Guildford:—

W. Holt & Sons	£2,420	T. H. Kingerlee	£2,167
R. Smith	2,387	W. Smith & Sons	2,163
Mitchell Bros.	2,375	Higlett & Hammond	2,121
A. Johnson	2,355	T. Norris & Sons	2,095
W. Greenfield	2,266	P. Peters & Son	2,057
G. Kemp	2,197	Potter Bros.	2,035
R. Wood	2,184	Bottrill & Son, Reading*	1,950
J. Longley & Co.	2,178		

* Accepted.

GUILDFORD.—For proposed additions to Perry Hill Board School, Worplesdon, Guildford. Mr. W. G. Lower, architect, Guildford:—

Glew	£992 0 0		£1,000 0 0
Norris & Sons	897 0 0		905 0 0
J. Martin	874 0 0		899 0 0
Higlett & Hammond	866 0 0		881 12 0
May	862 0 0		870 7 6
R. Smith	859 0 0		868 18 0
Peters & Son	821 6 0		835 8 6
Mitchell Bros.	816 0 0		809 0 0
R. Wood	779 0 0		790 0 0
Tribe & Robinson*	762 3 1		773 12 0

* Accepted.

ILFORD.—For alterations and additions to the Conservative Club buildings. Mr. Horace J. Cropper, architect, Yew Tree Villa, Ilford:—

R. G. Key	£851 2	G. Sharpe	£749 0
F. Willmott	849 0	F. Gowen	720 0
W. Watson	819 16	Ashmole Bros.*	689 10
Miles & Roberts	819 0		

* Accepted.

IPSWICH.—For the erection of a workhouse, Woodbridge-road, Ipswich, for the Union Guardians. Messrs. Stephen Salter, Adams, & Newcombe, architects, 28, Woburn-place, Russell-square, W.C. Quantities by Mr. J. S. Farmenter, Exchange-chambers, Ipswich:—

Everett & Sons	£32,215	Bennett	£26,800
T. & W. Pattinson	30 938	Coe	26,100
Gough & Co.	28,254	Grimwood & Sons, Ipswich and Sudbury*	25,773
Parkington & Son	28,000	Kerridge & Shaw	25,769
Girling	27,920		

* Accepted.

LONDON.—For the reconstruction of King's-road Bridge over the Regent's Canal, for the Vestry of St. Pancras. Messrs. Thomas & Taylor, 1, Victoria-street, S.W., Engineers:—

Thames Ironworks	£10,230	B. Cooke & Co.	£8,058
Wilkams & Wallington	9,200	Jackson & Son	7,076
Pedrette & Co.	8,270	S. Kavanagh, Surbiton Hill (accepted)	6,882
Somervail & Co.	8,152		

LONDON.—For rebuilding "Northumberland Head," Gun-street, Spitalfields, for the Winchester Brewery Company. J. W. Moss, architect:—

Clarke & Huntley	£2,380	Kilby & Gaford	£2,193
Ansell	2,333	Tomms (accepted)	2,128
Irwin	2,226		

LONDON.—For alterations and fittings, "Manor Arms," Manor-street, Clapham, for Mr. Davis. H. Dyball, architect:—

Williams & Son	£445	Eddie	£374
Ansell	437	Irwin (accepted)	373

LONDON.—For fittings to shop, Upper Fore-street, Edmonton, Mr. Herbert Riches, architect, 3, Crooked-lane, King William-street, E.C.:—

S. J. Scott	£275 0 0	Parnall & Sons, Ltd.*	£214 10 6

* Accepted.

LONDON.—For repairs and decorations to house, George-lane, S. Woodford, Essex. Mr. Herbert Riches, architect, 3, Crooked-lane, King William-street, E.C.:—

S. J. Scott	£373	F. J. Evans	£367
F. Osborn & Sons	402	W. Mundy (accepted)	315

LONDON.—For additions to "The Rose and Crown" Inn, Ilford. Messrs. C. Foulsham and Herbert Riches, architects, Bromley-by-Bow, E., and 3, Crooked-lane, King William-street, E.C.:—

W. Watson	£743	W. Chopping (accepted)	£664
T. Russell	709		

LONDON.—For the erection of Sabbath school buildings, Dalston Synagogue. Mr. L. Solomon, architect:—

Reason	£595	Roberts	£526
Cowsell Bros.	663		

LONDON.—Accepted for additions to No. 87, Charterhouse street, Smithfield. Mr. S. R. W. Morsman, architect:—

Reason £242

LONDON.—For the execution of decorative and other works, Lightcliffe House, Tottenham-lane, Hornsey. Mr. Edwin Evans, surveyor:—

Champion	£329 0	Houghton & Son	£187 0
Howard	189 10	Metcalf (accepted)	187 0

LONDON.—For erecting pumps and main at the St. Luke's Workhouse, Shepherdess-walk, E.C., for the Guardians of the Holborn Union. Mr. A. Saxon Snell, architect:—

J. Warner & Sons, Limited	£628	W. Reason, St. John-street, E.C.*	£486
J. F. Clarke & Sons	592		
Rosser & Russell	539		

* Accepted.

MACROOM (Ireland).—For the construction of sewerage works, &c., at the workhouse, for the Union Guardians. Mr. A. W. Barnard, C.E., Macroom. Quantities by the engineer:—
A. W. Smith, Bandon.....£340

MERTHYR TYDFIL.—For the execution of sewerage works, Abercanaid, for the Urban District Council. Mr. T. F. Harvey, C.E., Merthyr:—

T. Rees	£589 4 8	E. H. Page	£312 12 4
J. William	369 2 3	Lloyd & Son	310 9 4
J. Jones	347 16 10½	W. Lewis, Brithdir, Tredegar*	287 5 9½
D. & H. Protheroe	339 13 0		
T. Preece	309 17 2		

* Accepted.
[Surveyor's estimate, £340.]

NEWPORT (Mon.).—Accepted for rebuilding the "South Wales" Luncheon Bar" Hotel, Griffin-street. Mr. C. Telford Evans' architect, 8, Queen-street, Cardiff:—
Dyson Parfitt, Maindee, Newport.....£1,687

OLDHAM.—Accepted for the excavation, drainage, brickwork, and masonry, in the erection of school buildings, Shaw. Mr. Chas. T. Taylor, architect, 12, Clegg-street, Oldham. Quantities by the architect:—
J. Bryan £795

SOUTH SHIELDS.—For the erection of stable buildings, house, &c., for the South Shields Gas Company. Mr. Henry Grieves, architect, Albany-chambers, South Shields. Quantities by Mr. J. P. Allen, Newcastle:—

W. B. Ingram	£3,845 19 1	R. Allison	£3,320 0 0
Johnston & Co.	3,800 0 0	S. Sheriff	3,276 0 0
J. Moore	3,491 0 0	W. H. Brown	3,250 19 10
A. Ross	3,398 0 0	Bell & Matthews	3,194 12 0
W. J. Robertson	3,391 0 0	Goodwin & Son	3,098 0 0
T. Lumsden	3,383 0 0	Wm. Christie, South Shields*	3,075 6 0
T. S. Winter	3,370 0 0	R. Harper	2,944 18 0
M. Hall, junr.	3,352 0 0		

* Accepted.

SWAFFHAM (Norfolk).—For the erection of a vicarage house, Spoxie, for the Rev. A. A. Avann. Mr. H. J. Green, architect, 31, Castle Meadow, Norwich. Quantities by the architect:—

W. H. Brown	£735 17 0	Collins & Barber	£598 9 6
G. Jeffries	665 0 0	W. F. Curtis	544 0 0
Adcock & Sons	657 0 0	R. Mayes, East Dereham (accepted)	527 9 4
Bardell Bros.	621 0 0		

WALTHAMSTOW.—For the erection of two houses at Woodstreet for Mrs. Donelly. Mr. J. Williams Dunford, architect, 1000, Queen Victoria-street, E.C.:—
W. Lawrence .....£540 | F. Smith (accepted) £500

WALTHAMSTOW.—For additions and alterations to Everett's Stores Provision Department for Mr. R. T. Joby. Mr. J. Williams Dunford, architect, 1000, Queen Victoria-street, E.C.:—
W. Lawrence .....£397 | E. Fuller*.....£370

* Accepted conditionally.

WALTHAMSTOW.—For the erection and completion of three shops at St. James-street, for Mr. Geo. Whitehead. Mr. J. Williams Dunford, architect, 1000, Queen Victoria-street, E.C., and at Walthamstow:—
W. Shurmur, Clapton* £1,647 0 0
* Lowest (without basements) conditionally accepted.

WALTHAMSTOW.—For executing repairs to almshouses, or the Trustees of the Parochial Charities. Mr. Longmore, architect, 27, Great Alie-street, E.:—

K. & E. Evans	£254 0	F. R. Seed	£138 0
G. M. Page	235 0	J. Abbott	136 0
T. D. Allen	213 0	W. Mayhew	128 13
W. J. Penn	175 10	Stewart & Dayman*	112 7
W. Lawrence	163 0		

* Accepted.

TO CORRESPONDENTS.

A. S.—(Amounts should have been stated); J. R. D.—(Ditto).—J. G. (received too late).

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.
We cannot undertake to return rejected communications.
Letters or communications (beyond mere news items which have been duplicated for other journals are NOT DESIRED.
Any commission to a contributor to write an article is given subject to the approval of the article, when written, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.
All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

WEST BRIDGFORD (Notts).—For additions and alterations to parish church. Messrs. Naylor & Sale, architects, Derby:—

Fish & Sons	£6,605 0	Dennett & Ingle	£5,750 0
Enoch Kent	6,011 0	Hodgson & Sons	5,695 0
Enoch Hind	6,007 0	Thompson & Sons	5,414 10
Hutchinson	5,950 0	W. Green	5,400 0
Messom	5,789 0	C. Baines, Newark	5,239 0

* Accepted.

WHALEY BRIDGE (Lancashire).—For the erection of four cottages, Furness Vale, for the Co-operative Society. Mr. Thomas Armfield, architect, Whaley Bridge. Quantities by Mr. Frederick Oakes:—
John Hudson & Sons .....£640 | A. & G. E. Oakes, Whaley Bridge (accepted) £604

PUBLISHER'S NOTICES.

Registered Telegraphic Address, "THE BUILDER," LONDON.
THE INDEX and TITLE-PAGE for VOLUME LXX. (Jan. to June, 1896) was given as a supplement with the number for July 11.
CLOTH CASES for Binding the Numbers are now ready, price 2s. 6d. each; also
READING CASES (Cloth), with Strings, price 9d. each, and
THE SEVENTIETH VOLUME of "The Builder" (bound), price Twelve Shillings and Sixpence.
SUBSCRIBERS' VOLUMES, on being sent to the Office, will be bound at a cost of 3s. 6d. each.

CHARGES FOR ADVERTISEMENTS.

SITUATIONS VACANT, PARTNERSHIPS, APPRENTICESHIPS, TRADE AND GENERAL ADVERTISEMENTS.
Six lines (about fifty words) or under ..... 4s. 6d.
Each additional line (about ten words) ..... 0s. 6d.
Terms for series of Trade advertisements, also for Special Advertisements on front page, Competitions, Contracts, Sales by Auction, &c., may be obtained on application to the Publisher.

SITUATIONS WANTED.
FOUR lines (about thirty words) or under ..... 2s. 6d.
Each additional line (about ten words) ..... 0s. 6d.
PREPAYMENT IS ABSOLUTELY NECESSARY.

. Stamps must not be sent, but all small sums should be remitted by Cash in Registered Letter or by Postal Orders, payable to DOUGLAS FOURDRINIER, and addressed to the Publisher of "THE BUILDER," No. 46, Catherine-street, W.C.
Advertisements for the current week's issue are received up to THREE o'clock p.m. on THURSDAY, but "Classification" is impossible in the case of any which may reach the Office after HALF-PAST ONE p.m. on that day. Those intended for the Front Page should be in by TWELVE noon on WEDNESDAY.

SPECIAL.—ALTERATIONS IN STANDING ADVERTISEMENTS or ORDERS TO DISCONTINUE same must reach the Office before 10 a.m. on WEDNESDAY MORNING.

The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c. left at the Office in reply to advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

PERSONS Advertising in "The Builder," may have *Replies addressed to the Office*, 46, Catherine-street, Covent Garden, W.C. *free of charge*. Letters will be forwarded if addressed envelopes are sent, together with sufficient stamps to cover the postage.

AN EDITION Printed on THIN PAPER, for FOREIGN and COLONIAL CIRCULATION, is issued every week.

READING CASES, { NINEPENCE EACH. By Post (carefully packed), 1s.

J. J. ETRIDGE, Jr.
SLATE MERCHANT,
SLATER and TILER.
ESTIMATES GIVEN FOR
SLATING AND TILING,
To be Executed by Contract in any part of ENGLAND.
Penrhyn - Bangor,
Oakeley - Portmadoc,
And other description of Slates ready for immediate delivery to any Railway Station.
Applications for Prices, &c., to
BETHNAL GREEN SLATE WORKS,
BETHNAL GREEN, LONDON, E.

SUBSCRIBERS in LONDON and the SUBURBS, (by prepaying at the Publishing Office, 19s. per annum or 4s. 9d. per quarter), can ensure receiving "The Builder," by *Friday Morning's Post*.

TERMS OF SUBSCRIPTION.

"THE BUILDER" is supplied DIRECT from the Office to residents in any part of the United Kingdom, at the rate of 19s. per annum PREPAID. To all parts of Europe, America, Australia, New Zealand, India, China, Ceylon, &c. 26s. per annum. Remittances (payable to DOUGLAS FOURDRINIER) should be addressed to the publisher of "THE BUILDER," No. 46, Catherine-street W.C.

THE BATH STONE FIRMS, Ltd.
BATH,
FOR ALL THE PROVED KINDS OF BATH STONE.
FLUATE, for Hardening, Waterproofing, and Preserving Building Materials.

HAM HILL STONE.
The attention of Architects is specially invited to the durability and beautiful COLOUR of this material. Quarries well opened. Quick despatch guaranteed. Stonework delivered and fixed complete. Samples and estimates free. Address, The Ham Hill Stone Co., Norton, Stoke-under-Ham, Somerset. London Agent: Mr. E. A. Williams, 16, Craven-st., Strand, W.C. [ADVT.

Asphalte.—The Seyssel and Metallic Lava Asphalte Company (Mr. H. Glenn), Office, 42, Poultry, E.C.—The best and cheapest materials for damp courses, railway arches, warehouse floors, flat roofs, stables, cow-sheds and milk-rooms, granaries, tun-rooms, and terraces. Asphalte Contractors to the Forth Bridge Co. [ADVT.

SPRAGUE & CO.,
LITHOGRAPHERS,
Employ a large and efficient Staff especially for Bills of Quantities, &c.
4 & 5, East Harding-st., Fetter-lane, E.C. [ADVT.

QUANTITIES, &c., LITHOGRAPHED accurately and with despatch.
METCHIM & SON, 20, Parliament-st. S.W.
"QUANTITY SURVEYORS' TABLES,"
For 1896, price 6d. post 7d. In leather 1/- Post 1/1 [ADVT.

THE
French Asphalte
COMPANY,
Suffolk House, Cannon-street, E.C.
SUPPLY THE BEST MATERIAL AND WORKMANSHIP FOR BUILDINGS, DAMP COURSES, AREAS, ROOFS, WASHHOUSE AND DAIRY FLOORS, &c., &c.
This Asphalte was chosen to be laid at Sandringham, on the new General Post Office, and other important buildings.

TWELVE GOLD AND SILVER MEDALS AWARDED.
ZINC AND COPPER ROOFING.
F. BRABY & CO.
LONDON. ** LIVERPOOL. ** GLASGOW.
352 to 364, Euston-road, N.W. 6 and 8, Hatton Garden. 47 and 49, St. Enoch-square.
VIEILLE MONTAGNE SOLE MANUFACTURING AGENTS.
NO SOLDER. NO EXTERNAL FASTENINGS.
Particulars on Application. *Chief Offices: Fitzroy Works, EUSTON ROAD, LONDON, N.W.*